The Conquest of The Isthmus

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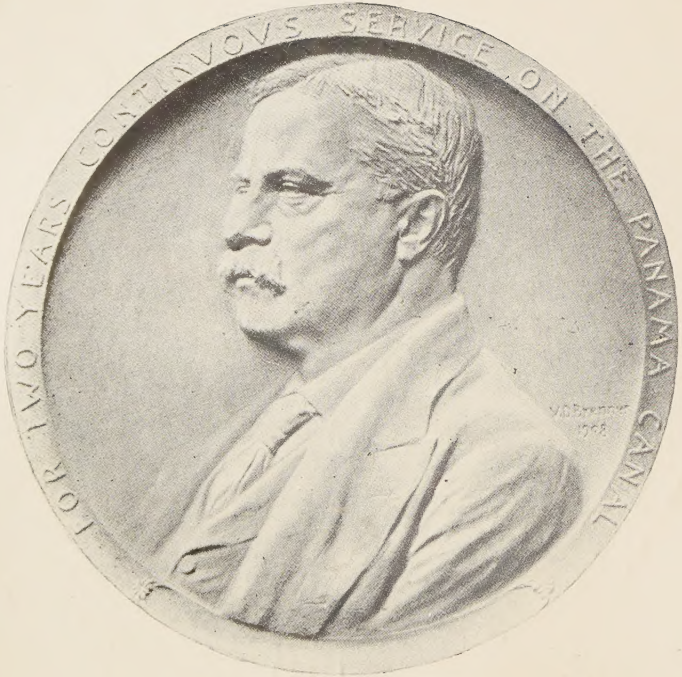

THE MEDAL TO BE PRESENTED TO PANAMA CANAL EMPLOYEES

EVERY AMERICAN EMPLOYEE OF THE CANAL COMMISSION SERVING TWO YEARS OR MORE ON THE ISTHMUS WILL RECEIVE IN RECOGNITION OF SUCH SERVICE A BRONZE MEDAL MADE FROM THE OLD FRENCH MACHINERY AFTER THE DESIGN OF V. D. BRENNER

The Conquest of the Isthmus

The Men Who Are Building the Panama Canal—
Their Daily Lives, Perils, and Adventures

By

Hugh C. Weir

Fully Illustrated

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BY
HUGH C. WEIR

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TO
MY WIFE

PREFACE

THE Panama Canal never will be dug by machinery alone. Beyond the steam shovels and the dirt trains, beyond the air-drillers and the dredges, the union of the Atlantic and the Pacific depends upon the men who are giving health, wealth, and life in the battle with the tropical jungle. It is of these men, the khaki heroes of the wilderness, of whom I would tell, the men who have rubbed elbows with death from almost every angle and in almost every guise, in order that the American nation might win the greatest industrial victory in the history of the world.

We have heard much of the industrial, political, mechanical, and financial sides of the Panama Canal. In fact the mass of material of this kind we have digested has smothered the human aspect of the great waterway. In the discussion of locks and dams, the romance of the Isthmus has been overlooked. In the search for graft and failure, the muck-raker has ignored the deeds of daring and danger which dot the

canal from Colon to Panama. We have been given the red-inked reports of the engineers, and have missed the red-blooded stories of heroism behind them. It is these that I would present in the pages which follow.

The steam shovels at Panama are tearing three million cubic yards of dirt from mountain and jungle every thirty days. This is a big record, the biggest in the engineering history of the world. But it was not to study the steam shovels that I visited the Isthmus. On the contrary, it was to give my attention to the shirt-sleeved, sun-tanned men who are operating the steam shovels.

Uncle Sam is maintaining an army forty thousand strong in the heart of the Panama jungle, over two thousand miles from the base of supplies. In some respects it is the most unique army of peace or war that has ever flown the American flag. What is the daily life of this army? How does it work? How does it play? How and where does it spend its evenings in the tropical wilderness? Hundreds of the men have their wives and children with them. What type of frontier civilization do they find? These are some of the questions I have tried to answer, and in the effort I have left the mechanical side of the Panama Canal for the engineer and the muck-

raker, and have dealt mainly with the human side.

Also, as the history of the Canal is not confined to the present, I have endeavored to gather something of the romance of its past and to add to the daring deeds of the twentieth century the achievements of other centuries that have contributed their part to the progress of to-day and the victory of to-morrow.

Portions of this book first appeared in periodicals—*Putnam's Magazine*, *The Railroad Man's Magazine*, and *The American Boy*—and thanks are offered to these publications for permission to use the material in this volume.

H. C. W.

New York City,
May 1, 1909

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The Conquest of the Isthmus

CHAPTER I

THE KHAKI HEROES OF PANAMA

IN the darkness of the Panama night, a row of ghost lights blinked at me, as I lounged on the second-floor veranda of the Cristobal Y. M. C. A. building. They were the electric bulbs of the half-circle of Government quarters at my left, blurred and shadowed by the haze of the mosquito netting stretched before them.

Over in the distance I could see the moon-silvered Atlantic. The jangle of a cab-driver's bell sounded sharply at my elbow. A khaki-clad policeman paused in a stray beam of light, and fanned himself with his broad Stetson hat. A Jamaican negress, bedecked with red ribbons, flaunted past him. It was my first night in the Canal Zone, and I was curious.

A sudden burst of shouts behind me brought me

around abruptly, again conscious of the sweltering November heat of the Isthmus.

Through a long open window of the gymnasium, I could see the climax of a vigorously waged basket-ball game, the perspiring contestants apparently oblivious of the humidity which had wilted two collars for me during the day. Dodging, leaping, squirming, the lithe figures were massed now around one goal, now around the other,—the bouncing leather ball a thing of life in their surging midst. I was watching Uncle Sam's Canal-builders at play.

A few hours before, the darting men in the "gym. togs" might have been seen among the "steam shovel" or "dirt train" gangs of the Isthmus, in the Panama Railroad shops, or bent over a desk in any of the score of Government offices within a two-mile radius. These are the men—the young men—who are digging the biggest canal in the world's history, against odds which the American nation, of the three that have tried, alone has conquered. These are the men whom the average resident of "the States" pictures as lying on the red Panama mud, half dead with malaria or yellow fever, dodging snakes and eating decayed rations!

I was seeking the real life of the Canal, not that

darkened by the sombre hues of the pessimist, nor yet that brightened by the rose tints of the optimist, but the every-day conditions of work and play of the every-day man—yes, and woman and child—associated with the digging of the "Big Ditch." Was this a typical sample?

A youth, seated at a corner piano, was drumming through the strains of a late Broadway hit when I stepped back into the building. The basket-ball contestants had dispersed to the shower-baths. Across the corridor, a long row of men were turning the files of recent magazines. It was the conventional Y. M. C. A. scene at any of the compass points at home. And this was—the Panama jungle!

Downstairs we stopped at a modernly equipped soda fountain for an iced drink, and the secretary, M. J. Stickel, stepped across to a well-filled cigar case.

"We have all brands here, for all tastes," he said, smiling. "Which will you have?"

"Is this your wilderness?" I queried. The secretary laughed grimly, as he flashed the prompt reply:

"You 'll find that easily enough, perhaps more than you care to see of it! The jungle is vividly real to us down here—blacker even than it is

painted—possibly to emphasize the more——"

"This?" I finished, nodding toward the inviting reception-room behind me.

"Oh, this is but a small fraction of the civilization we are building—in order to build the Canal. The 46,000 persons on the Government pay-roll cannot live in a wilderness, therefore, we must civilize the wilderness. We can't move the jungle but we can move home comforts—and we are trying to dovetail the two. The Y. M. C. A. club-house is only a link in the chain. Yes, the jungle is here—we never forget it!—and the story of its taming is quite as wonderful as that of the digging of the Canal, only the public has not heard it."

The red-underscored emphasis merited by this statement I was soon to discover. As yet I was only on the rim of the true Panama—the pulsating details of the twentieth-century battle with the wilderness and the type of homes, schools, churches, stores, amusements which it has built. As we pause, let me give you a budget of items from my Panama note-book, which came to me in a rapid-fire fusillade in the night-and-day itinerary that followed.

Through a belt of land ten miles in width and fifty miles in length, spanning the Isthmus of

THE YOUNG MEN'S CHRISTIAN ASSOCIATION CLUB-HOUSE AT CULEBRA

Panama from ocean to ocean, the American flag is dominant with the exception of two points. In the records of the War Department, this territory is entered as the "Canal Zone"—the course of the proposed waterway subdividing it almost evenly. At one extremity squats the colorless town of Colon—at the other, the historic streets of Panama rear their picturesque buildings, the only points of the Canal territory which do not owe allegiance to the Federal Government. Between the two, the thin line of the Panama Railroad wends its winding jungle-course, through a color-splash of cannas, orchids, and coleus plants—in three hours carrying passengers in its grimy, dusty cars from the Atlantic to the Pacific, a distance requiring three months to traverse by the present water route.

Dotted through the narrow land-ribbon are twenty-seven mushroom villages and wayside stations, some nearing the dignity of a thriving American county seat, others little more than a cluster of houses perched about a telegraph office. And on both sides, stretching away for hundreds of miles, is the deep, dark, dismal underbrush of the jungle.

Under American jurisdiction is a population of 54,325 people, depending on the Government for

food, shelter, clothing, to whose necessities, comfort, and recreation Uncle Sam caters in the heart of a wilderness two thousand miles from the base of supplies.

In this population are included forty nationalities, ranging from Austrians to Canadians, from Chilians to Chinese, from Jamaicans to Scandinavians.

Of the total number of residents, nearly 20,000 are fed at Government mess tents and hotels, making a monthly average of one million meals which Uncle Sam must serve! To meet the diversified tastes of the patrons, literally a world-restaurant must be maintained—in the tropical underbrush.

From the ten-cent rations of the West Indian negro and the twelve-and-a-half-cent meal of the European laborer, the scale ranges upward to the thirty-cent menu of the Government hotel—and not one pound of the tons of provisions consumed is obtained from the Isthmus itself. A transportation problem of nearly twenty-five hundred miles must enter into the preparation of every meal.

Further, the Government must supply provisions to those residents who do not board at Federal quarters. The commissary department

carries a pay-roll of 524 employees and its monthly expenses total $350,000. Entries such as the distribution of fifteen tons of rice and three tons of sugar a week are common in this wilderness department-store.

In the shadow of the jungle, have likewise been established a Federal cold-storage plant, with a capacity of 620 tons, from which 435,000 pounds of beef alone are distributed each month,—an artificial ice factory, producing sixty tons daily, seven days in the week,—and a Government bakery turning out 18,000 loaves every twenty-four hours, with no Sunday rest!

In the same list follow a Federal laundry and a printing office, with plans under way for macaroni, coffee-roasting, pie-and-cake-baking plants, and even a tailoring establishment! A jungle police force with 208 members has been formed, eleven fire-engine stations have been erected, twenty-four schools have been organized on this Central American frontier with one thousand enrolment, and the Canal Commission has lately added to its pay-roll eleven chaplains. American energy has even installed eight hundred telephones in the wilderness!

Staggered, are you? And yet these facts do not include one mention of the Canal, the central

feature of Panama. This summary belongs essentially to the civilization-builders—the work of the Canal-builders is another story.

The great jaws of the jungle swallowed a village a few years ago—during my Isthmus-roamings it was forced to disgorge. Buried under a mass of tropical vegetation, with outreaching talons like a devil-fish, the settlement was unearthed by the Government engineers after days of back-cramping labors, where even the blade of the machete seldom found room to strike. Thirty-two solidly constructed buildings—nine married quarters, twenty-two barracks, and a machine shop dating from the glory of De Lesseps—were uncovered beneath the tangled tons of foliage, which had hidden them so completely that their existence was entirely unsuspected. As dusty pigeon-holes unfolded the history of the settlement, it developed that it had disappeared from the records of men when the French had been routed from the Canal Zone a generation ago—with millions of francs in useless equipment behind them and millions of francs in useless debt before them. It had needed but twenty-five years for the talons of the jungle to bury a village large enough to shelter a thousand men!

This is the wilderness that for hundreds of

miles has not known the foot of a white man, through which Uncle Sam's civilization-builders are stretching a twentieth-century wonder-chain.

A slow-speaking, bent-shouldered young man, who has an unobtrusive habit of talking little and listening much, smiled at me across a big paper-littered desk when I sought the leader in this jungle-battle. Had it not been for that smile, I would have been disappointed in my first view of the man, who had been described to me as the "Backbone of the Canal."

Jackson Smith, chief of the Isthmian Department of Labor and Quarters and seventh member of the Canal Commission, has worked too hard at Panama to be prominent in the public eye in its roster of celebrities. With the silence of the man who does big things, he has laid the foundation upon which others have built. Feeding, clothing, sheltering the army of peace that is worming the Canal-course from ocean to ocean is the giant task he has faced and conquered —in cold figures, a greater problem than the maintaining of the entire United States regular army!

With a curiously growing enthusiasm I probed for details. "How have you done it?" I

queried without preamble, to which he made characteristic answer thus:

"By organizing a small army of experts for taking care of human beings!"

Silence stretched over the next sixty watch-ticks. Outside, the mid-morning Panama sun splashed a yellow radiance down onto the rain-washed red clay.

"And every one of these experts was made in the thick of action," continued Mr. Smith as easily as though he had not paused. "They are men who have been taught what to do and how to do in the shoulder-to-shoulder school of experience.

"Somebody has said that the Panama Canal is the dumping-ground for other countries' cast-off citizens. This is true and not true. The good in our consignments of men outweighs the bad: a half-man could not do the man's work the Isthmus is showing. Our experts must know men, know them as they would know a text-book. The man from Italy cannot be handled like the man from the West Indies or the man from Milwaukee. The Italian has been raised on macaroni. The juiciest beefsteak would not appeal to him if you banished his macaroni. The West Indian thrives on rice—and nothing will take its place. The man from

the States is the only resident on the Isthmus who will eat anything and everything—except Panama cooking!

"We must have the menus of Spain and Italy and France and China and the West Indies—and the other thirty-four countries from which Uncle Sam's Canal-builders are gathered. It is an international menu we must serve down here, for we are really feeding the globe!

"Last year," Mr. Smith smiled as he circled around another bend of his subject, "3570 men were employed in our building department. During the twelve months, 588 houses were finished—in the heart of the jungle, if you please! —with the supply always below the demand. In addition, eighteen new mess halls, four Y. M. C. A. club-houses, two lodge halls, four school buildings, one church, and four post-offices were erected—by the men whom the public never hears anything about!

"Nearly 2500 electric lights were installed in Culebra alone during the year. In the twelve months, over 1,000,000 pounds of lead were used by our house painters. Paint is a central detail of house-building in the tropics. We do not use plaster or wall paper in Panama owing to the climatic effects, and the interior as well as the

exterior of the dwelling consequently must be thoroughly painted. The temporary nature of most of our buildings makes it necessary to paint the floor joints also, so that a four-room structure on the Isthmus will require as much paint as would be used on a fourteen-room building at home.

"Our work is not completed, however, even when the last nail of the dwelling has been driven, and the last plumbing fixture installed. We must furnish as well as build the house. It is clearly impossible for the Canal employees to bring their household furnishings with them. Therefore, the Government finds itself confronted with another civilization-problem, and answers it by supplying furnished houses.

"Uncle Sam is the most generous landlord that ever delighted a tenant's heart. Not only does he give quarters rent-free, with a liberal furniture allowance absolutely gratis, but he donates the electric-light service as well! With the items of rent and light eliminated from a family's expense account——"

"Perhaps the increased cost of living in other respects is not so heavy," I finished cynically.

Mr. Smith silently fumbled about his desk. He was studying a typewritten table of figures when he looked up.

"I have here New York market prices for October," he said quietly, "and those of the Government commissaries in the Canal Zone. In thirty-seven items in a list of sixty-four, the shopper could buy cheaper at Panama than in the stores at home! In eight cases, the market prices here and in the States were equal, in nineteen instances the American stores offered slightly better bargains. Digesting the list, we find that there is an actual net saving of $1.50 in favor of the Panamanian markets in the sixty-four articles, an average saving of 2½ cents per item! And this in spite of the fact that the New York merchant sells at home, while we must consider a transportation of more than two thousand miles in the cost of every item, with the exception of our fruits."

As Mr. Smith paused to explain that the commissary department is now under the control of the Panama Railroad—like the Canal, a Government-owned institution,—I jotted down sundry items of those vividly emphasized market quotations. In battle array they follow:

		New York.	Panama.
		cts.	cts.
Beef, stew	per lb.	14	10
Beef, corned	" "	12—15	10—14
Steaks, porterhouse	" "	25	22

	New York. cts.	Panama. cts.
Steaks, tenderloin per. lb.	22	22
Veal, loin " "	22	12
Veal for stewing " "	16	08
Mutton, short cut chops " "	22	19
Lamb, entire fore quarters " "	14	11
Sausage, pork " "	25	16
Turkeys " "	24	26½
Eggs, fresh, dozen	35	34
Bacon, strips, lb.	25	23
Lard, 5 lb. tins, each	85	65
Butter prints, prime quality, lb.	39	38
Cheese, cream, lb.	23	22
Oranges, dozen	60	12
Bananas, doz.	15	5

Dovetailing neatly into the exhibit, is the column of figures given me by S. M. White, the Government storekeeper at Colon, as sharp-teethed illustrations of the volume of business surging through the channels of Uncle Sam's giant department-store, with its output of eighty tons of supplies daily.

What the Isthmus Eats in a Single Month

435,000 lbs.	beef
15,000 "	mutton
12,000 "	veal
14,000 "	ribs
2,000	turkeys
20,000 "	butter
5,000 gals.	milk
5,000	fowls
2,000	chickens
5,000 lbs.	liver

30,000	lbs.	pork
20,000	"	beef loins
20,000	"	macaroni
70,000	"	coffee
468,000		loaves bread

Fifteen freight cars are needed every twenty-four hours to deliver the orders of the jungle commissary department. Five cars of ice and cold-storage supplies leave Colon every morning—their wares coming as a godsend in the tropical wilderness. Two more cars are loaded to their greatest capacity with the daily output of the American bakery. One car is filled with fresh vegetables, and seven cars with staple groceries from the mammoth warehouse every evening ready to begin their journey across the Isthmus soon after midnight.

This is how the Americans are winning at Panama—in the blackened trail of other nations' failures.

At the wayside stations, bordering the Panama Railroad, modernly equipped commissary wagons are waiting, ready to carry to the purchaser the list of goods, large or small, ordered the day before. A twentieth-century delivery system in the recesses of the wilderness!

Through ten branch stores the commissary department is extended through the jungle—and

in not one station can a purchase be made for cash! A system of coupon-books has been established, whose checks range from one cent upwards in value. These only are accepted for Government purchases. One book may be used at any or all stores, and is listed at a cash basis of $15.00, individual accounts being kept with employees in good standing, when their books are exhausted before the monthly pay day. To prevent a possible conflict in prices at the various commissary branches, a general price book is issued every thirty days, and oftener in the case of the grocery department, which enables the purchaser to know in advance what his week's or month's provisions will cost him, whether they are bought on the Pacific or the Atlantic coast.

In vivid comparison with these strides of progress, is the story that only a little more than three years ago it was necessary to knock the old French machinery of the Canal apart to obtain nails for the erection of bunks!

Those were the "early days" as reckoned by the old-timers—1904!—when mirrors were at a premium and men were forced to shave by the aid of the window panes, when the deadly black scorpion was an all-night bedfellow, and a man was allowed only one hand to eat, using the other

the while in a frantic effort to keep the mosquitos at bay!

Like a fantastic nightmare these conditions appear to-day to the man who, for thirty cents, may order a menu like the following at any of the fifteen Government hotels:

Oyster stew; roast turkey (stuffed) with cranberry sauce; beef à la mode; sliced tomatoes, sugar corn, mashed potatoes, rice fritters with vanilla sauce, asparagus on toast; banana custard, cake, watermelon; tea, coffee, and cocoa. Or this sample:

Mixed pickles; Rhode Island clam-chowder; lobster with mayonnaise; roast young turkey (stuffed) with cranberry sauce; French toast with fruit sauce; asparagus with melted butter; potatoes in cream; chocolate ice-cream; jelly cake, cheese, crackers; tea, cocoa, coffee.

Can you surpass these meals—served in the Panamanian jungle—for the same figure at an American restaurant?

As a business proposition, does it pay? During the month of September, 1907, there was a loss of roughly $3000 in the $150,000 receipts of the subsistence department. The month of October, on the other hand, furnished a profit of practically the same figures. As the balance sheets of the

two months were spread before me, Superintendent J. M. McGuire, of Ancon, explained that the additional one day in October was responsible for the difference—so close is the margin of the department that a month of thirty-one days will show a gain, while a month of only thirty days will indicate a corresponding loss. Uncle Sam does n't make any profit, but he gives his men good meals!

In the city of New York, the death-rate is estimated at the ratio of eighteen persons to the thousand. Among the white employees of the Panama Canal, the death-rate during the month of August, 1907,—the worst season on the Isthmus, —was only 8.57 to the thousand, less than half of the New York figures!

And yet this is the plague spot, which at various times during the early eighties wiped out forty per cent. of the Canal employees of the old French régime!

Negro residents at Panama furnish the bulk of the mortality, although here again the amazing work of Colonel W. C. Gorgas and his superb sanitary department is conspicuous. Five years ago, the death-rate among the blacks was 120 per 1000. To-day it has been reduced to one quarter of that figure.

In New Orleans, Venice, St. Petersburg, and Moscow, the rate of mortality ranges from 22 to 28 per 1000, in all cases higher than the average at Panama; in Alexandria, Cairo, Calcutta, and Bombay, it ascends to from 30 to 48 per 1000. In Madras, it even reaches the height of 58 per 1000. It is apparent that the Canal Zone has become the most healthful spot which the tourist can find throughout the length and breadth of the tropical belt of the globe—a triumph of American sanitary methods, which only the Panamanian of yesterday fully appreciates.

Last year, the postal service of the Canal Zone transmitted $2,318,965 in money-orders. The bulk of this amount, $1,724,383, represented the savings of the 5000 American employees, forwarded to their families or to banks at home!

The civilization-builders at Panama believe, as a fundamental principle, in working with the right kind of material—and men.

The women at Panama?

They are there, in quantity and quality. The Labor and Quarters Department has over 500 applications for married quarters on its waiting list at the present time, and the last census of the Canal Zone showed 982 white women and 758

children already established under Panamanian roof-trees.

It is related that an overworked justice of the peace at Colon married eight American couples in less than eleven minutes! The brides were newly arrived from "the States" and the wedding ceremonies were performed on the dock, the young women ready to follow the flag in its wilderness path from ocean to ocean—fit helpmates for the heroes who are not soldiers, the khaki-clad men of the Panama jungle.

MEAL TIME AT AN I. C. C. KITCHEN—LOWER RIO GRANDE

CHAPTER II

THE MEN OF THE "DIRT" TRAINS—AND OTHERS

THE section boss thrust his head beyond his tent-flap and instantly drew back with a hoarse gasp of terror. Half-dressed and half-stunned, he took a cautious step outside the door, and then another, and another, until he came into full view of the half-moon of twisted, bloated horrors, swung on the palm trees before him.

One hundred and twenty-five coolies from the Chinese camp were suspended by their cues from the swaying branches! Driven mad by the gloom of the jungle they had sought wholesale suicide in the night.

For years the section boss had rubbed elbows with death. He had come to look upon grim things with a grin. But as he digested the scene before him, his knees gave way and he toppled forward in a sprawling faint.

The incident was but one link in the chain of horrors of the Panama Railroad. Those were red

years for the construction gang of the first line of rails to span the American continent.

On a road-bed of blood the ties were laid which were to mark an industrial epoch. If it was the narrowest point of the continent, it was also the wildest. Forty-seven miles linked the Atlantic and the Pacific at this land-ribbon of the Caribbean but they were forty-seven miles of tragedies.

With the exception of a wandering adventurer, the engineers were the first white men to force a way through the jungle since the dare-devil days of the Spanish Main. And it was the Devil's Own Cauldron, in very truth, into which they plunged.

There are those who say the road cost a life for every tie. Exaggerated? Possibly—but grim facts show that more than six thousand men went to their deaths in the tangled underbrush before the last rail was laid! Every mile of progress cost over one hundred and twenty-seven lives.

The history of those forty-seven miles of track is one of the most tingling, red-blooded chapters in all the records of American railroad building. It is more. It is a monument to the undaunted, unrivalled heroism of American engineers, which no section of the globe can surpass.

It is something over half a century ago—to be

exact, in the autumn of 1849—that the first construction gang, bunking at night on board a cramped sailing vessel in the Colon harbor, plunged into the red mud of the Panama swamps. Waist-deep in the slimy depths, forced to chop every foot of the way through the heavy, interlacing foliage, the men entered resolutely into the task which was to stretch over a period of more than six years.

In that first year over one hundred died from snake bites alone. The victims of the tarantula and the scorpion numbered as many more.

Buzzing swarms of mosquitoes from the pestilent pools and streams inland settled like a heavy gray cloud over their shoulders, bringing typhoid, malaria, yellow fever. Men died by scores and hundreds, and their comrades, with the sickly yellow of disease stamping their brows, gave them a hasty grave and a hastier prayer, and plunged again into the conquest of the wilderness.

Nature conspired to make the picture yet blacker. Sudden stretches of quicksands were found, whose boundaries were marked by the despairing shrieks of stumbling victims. The swamp grew thicker and blacker and marshier. Engineering statistics report that often bottom was not found at a distance of 180 feet!

Thousands of cords of wood and stone were dumped into the mysterious morasses in a desperate effort to construct causeways for the road-bed.

Even to this day, in the gloomy shadows of the Black Swamp—a scant five miles from the Atlantic terminal of Colon—the slimy earth sinks into a yawning cavern, and rails, ties, and men drop forever from sight. Once a freight car was dumped into the hungry morass in an effort to make a solid surface. Within six hours the car had disappeared from view, and the black slime seemed to clamor for more!

It was at Bas Obispo that the wholesale suicide pact of the coolies climaxed the terrors of the road-builders. In the early fifties, a consignment of one thousand Chinese had been imported to recruit the shattered ranks of laborers. For six depressing weeks, the coolies struggled under the lash of the jungle.

When the swaying burden of the palm trees, in the soft light of the early morning, showed the ghastly fate their companions had sought, it was as a spark of gunpowder. The Americans endeavored in vain to check the mill-race of the panic.

Before the day was over, three hundred more had been added to the suicide-roll. Scores rushed to the shores of the Atlantic, and squatting

THE DINING-ROOM—TIVOLI HOTEL

stoically in the sands, waited for the white crest of the tide to sweep them away.

It was from Reynolds, civil engineer, and Brewster, mining prospector, that I heard the story as we sipped English "Cola" on the veranda of the Cristobal Y. M. C. A. building, just above the blue Atlantic. Reynolds nodded to the group of railroad men who lounged out of the reading-room as he rose to his feet.

"Yes, it's a black-bordered story," he said slowly. "The history of the Panama Railroad isn't made up of ice-cream adjectives!"

"But the men who gave their lives for it didn't die in vain," added Brewster gravely, and we all stared out at the gray line of the surf in silence.

Afterward, I verified the date I had in mind. It was on the 27th day of January, 1855, that the first locomotive crossed the American continent from ocean to ocean—by way of the Panama Railroad.

Coupled with the heroism of the builders, the greed of the promoters has been the outstanding quality in the history of the Panama Railroad. In the course of fifty years it is estimated that the line—less than fifty miles in length—has made a net profit of more than $75,000,000! In proportion to its size, it has probably produced the

greatest earnings of any railroad in the history of the world.

It was in 1848, at the beginning of the California gold craze, that William Henry Aspinwall, John Lloyd Stephens, and Henry Chauncey, of New York, incorporated the Panama Railroad Company. From the outset, the most amazing hold-up schemes in railroad history were instituted. The original cost of the line amounted, roughly, to $8,000,000. Often the profits totalled $2,000,000 annually!

For years a passenger rate of sixteen cents a mile was demanded. Realizing how thoroughly the line dominated the trans-continental shipping situation, the company announced the most colossal freight rate ever known.

A toll was established, amounting to fifty per cent. of the transportation-charge for the entire distance between New York and Valparaiso, 4630 miles. In other words, the shipping expense for the forty-seven miles of the land route was as great as the charge for the 4583 miles of the water-route!

Enormous quantities of coffee from the Central and South American plantations were shipped to European markets via the Panama Railroad. The total transportation charge was $30 a ton.

Of this amount the railroad company coolly demanded one half—$15 for forty-seven miles!

The shipper was helpless. The railroad could carry his goods from ocean to ocean in five hours. On the other hand if he followed the water-route and sent his products down around Cape Horn, often five months were required to make the same distance.

In the fall of 1879, when De Lesseps undertook the construction of the Panama Canal for the French, the railroad was offered to him for $14,000,000—a rate of $2000 a share. De Lesseps haughtily informed the company that it was a hold-up price.

"Very well," was the calm rejoinder. "The price will advance $25 a share every six months."

De Lesseps shrugged his shoulders and went to work. The railroad officials grinned and also went to work. The shipments of the French supplies began to be delayed.

Machinery which reached Colon in September did not arrived at Culebra, fifteen miles away, until October. Cars, filled with French goods, were mysteriously side-tracked and allowed to stand for days in the jungle. Gradually De Lesseps realized that the railroad had the upper hand.

"How much for the stock now?" he asked in desperation.

"It is twelve months since our first offer," was the reply. "You will have to pay $250."

And De Lesseps paid it. Instead of $14,000,000, the road cost the French $17,500,000.

For twelve years the Panama Railroad remained under French ownership. It was in 1902, when France shook herself free forever from the shadow of De Lesseps' historic failure in the Panama jungles, that the American Government secured the railroad, together with the entire Canal property and equipment, for $40,000,000—less than half of the value placed upon it by a conservative receiver!

Although both the Panama Railroad and Panama Canal are Government institutions, a broad line separates the two. The former handles the dirt trains of the Canal entirely in the relation of a lessee.

Nearly three million cubic yards of dirt are excavated by the Canal-diggers every thirty days. Were it not for the Panama Railroad, the question of its disposal would make the task of the Isthmian Canal Commission an impossibility.

The Canal commissary has lately been merged with the railroad, and the operation of Uncle Sam's giant department-store, at a monthly expenditure

of $1,000,000, is linked with the other details of the line. In a nutshell, the railroad is the fundamental pillar of the Canal. When all is done and said, the railroad men, the men of cab and caboose and dirt train, will rank among the heroes of the Panama Canal.

Six thousand men are carried on the pay-roll of the Panama Railroad. A passenger schedule of seven trains daily from ocean to ocean is maintained, but the bulk of the road's labors lies in the transportation of the mountain of dirt excavated from the course of the Canal. In the Culebra Cut alone, 167 locomotives are constantly employed.

In the equipment of the road are numbered 261 engines, 1464 forty-ton flat cars, and 1200 dump cars. Six hundred tons of coal are consumed daily. For every ton of coal that is burned up, 185 tons of dirt—"spoil" in Canal slang—are carried from the "Big-Ditch," to be dumped in one of the scores of disease-breeding swamps of the jungle, or to be used in the construction of the dams and reservoirs of the great waterway.

Dotted along the course of the railroad are twenty-six straggling stations, at nine tenths of which passenger trains are scheduled to stop. Because of these delays and the winding nature of the track, it requires two hours and a half to

traverse the forty-seven miles of the line. If the speed of the average train of "the States" could be maintained at Panama without wayside stops, the passenger would be whisked from the Atlantic to the Pacific in less than sixty minutes!

The perils of the Panama Railroad are not confined to the past. The red-blooded chapters of its building have almost as thrilling a sequel in its present-day operation.

For example there is the menace of the outlaw. We were perhaps four miles out of the Panama station one November day of 1907, when a hoarse shout of warning came from the track ahead.

A man in a dusty suit of khaki sprang into the centre of the ties, waving his arms frantically. As the train slowed to a reluctant halt, the conductor muttered savagely, "This is the second time this week. If I had my way we'd shoot every outlaw on the Isthmus!"

"Outlaws?" I repeated, as we dropped to the hard, red clay. He turned a pitying smile in my direction: "Only about three thousand of 'em," he answered, "in a stretch of forty miles!"

The next instant, he was running over the ties toward the little group ahead and I plunged along at his heels. A dozen yards from the locomotive, we came upon a startling scene.

For a distance of fully twenty feet the rails on both sides of the track had been torn away and tossed in a half-hidden pile over among the jungle trees. At our right, a sharp ravine plunged downward from the ties, where the train would have been sprawled in a jumbled mass of wreckage, but for the timely warning which had checked our progress.

We had barely escaped disaster. Even to a novice, it was evident that train-wreckers of the most desperate type had been at work.

The engineer—just now a sweating, swearing man—was speaking, as we reached the knot clustered about the broken rails.

"I say it's been done in the last two hours," he said with emphasis, as his right fist was brought down into the palm of his left hand.

The man in khaki, who had shouted the warning, nodded grimly.

"I've been watching this stretch of track for six hours. Shanton has had the police patrolling the line ever since the dagoes tried to ditch you Saturday, you know. When I went by here two hours back, the track was clear. If I had n't come along fifteen minutes ago——"

"I don't suppose you saw the chaps, Bill?" broke in the engineer. Instinctively, we all glanced

over our shoulders, toward the dark line of the jungle foliage that bordered the winding track. The entire party could have been covered by a dozen rifles and none of us been the wiser.

The patrolman shook his head at the engineer's question.

"They're too shrewd for that. A more cowardly set never lived than those gentlemen of the brush. They'd shoot you on sight if they could do it from behind one of those trees, but they'd dig all the way down to South America before they'd stop and face you in a fair fight. See them? Not on your life!"

"What's their game?" put in the fireman. "Pay day is two weeks off."

"What was their game last week?" echoed the policeman. "Those chaps know there's no money on this train as well as you do. They're out for pure, unadulterated deviltry, with no more idea of loot than that monkey in the tree over there. They would ditch you for the cold-blooded pleasure of it! That's the stamp of outlaws we're entertaining down here in Panama, gentlemen,—the yellowest breed on this side of the lower regions!"

"Why don't you drive them out, then?" I queried in amazement as the passengers began

to gather and the trainmen made brisk preparations for replacing the rails. The patrolman shrugged his shoulders.

"It's cheaper to let them stay where they are—when you've got a police chief like ours, who's not afraid to use his gun! I guess the next time that the Spanish jails are cleaned out, though, they won't dump their 'bad men' over here in Panama. That's the trouble now. We got a consignment of nearly three thousand, when the heir to the Spanish throne was born and Alfonso celebrated with a wholesale pardon—at our expense. Oh, railroading down here on the Isthmus, my friend, is n't what you've been used to up in the States! Not by a long sight!"

After that introduction to the Panama train-wreckers, I was ready to agree with him.

Captain George Shanton, the Rough Rider head of the Canal police force, gazed at the end of his cigar with a grunt, when I brought up the subject that evening.

"Yes, it is a tough proposition—eight hours in an engine cab in Panama," he admitted reflectively.

"There's more than one chap over there in the jungle, who'd like to set up as a second Jesse James and he's always ready to show what he can do in

the line of gun-play. The railroad man who 's looking for an easy run had better take a friend's tip and go the other way. But if he's got red blood in him——"

"Yes?"

"We always have room for him. He'll find a friend's hand as well as an outlaw's gun."

Shanton slowly knocked the ashes from his cigar.

"And then, of course, there's the dynamite in the railroad man's calculation," he continued.

"The dynamite!"

"We shot off two thousand tons of it down here at the Canal in the last six months. Can you figure what that would do if it were ever exploded in one blast? Little old New York would look like a bowling alley after a ten strike."

"But the railroad man has nothing to do with that."

"You mean he wishes he had n't. When one of those giant blasts lets go in Culebra Cut, all the country within two miles knows what has broken loose. The engineer may find half a dozen boulders on the track before he gets beyond the storm-centre. He can count himself lucky if they come down on the rails and not on the cab!

"Yesterday, a brakeman was telling me of a

MESS-HALL KITCHEN FOR EUROPEAN LABORERS

rock that came within a foot of his head. I suppose you'll think his yarn has a Münchausen flavor but we are used to it.

"He was walking the ties about a mile from Culebra when the dynamite gang over at the Cut began to get busy. He had brought his pipe out of his pocket and was striking a match when a two-foot boulder came smashing down over the trees and fell between the rails just before him.

"If he had n't slackened his steps to strike the match, the rock would certainly have crushed his head!"

Shanton smoked for a moment in silence. "Of course, we 've got to consider the natives also," he added with a smile.

"Do they take kindly to railroad men?"

"About as kindly as they do to the dirt-train. It's against the principles of a Panamanian to get out of the way of any train. He has a firm belief that the engineer ought to switch around him. Some of them actually stand still and grin at the pilot!"

"And what happens?"

"Well, last week, three of them were sent to join their ancestors. Does n't seem to feaze 'em, though, and the new engineer from the States soon becomes used to it. By the time he gets his

first pay envelope, he takes the ways of the natives as a matter of course."

I was to hear more of the natives and the railroad man from Secretary Bucklin Bishop, of the Canal Commission.

"I'll put it in the form of a story," said Mr. Bishop reminiscently as we chatted at the Hotel Tivoli. "The native can grasp but one idea at a time. Endeavor to give him more and he collapses hopelessly. One idea is the extreme limit of his capacity.

"A short time ago, the railroad officials were troubled by the number of unauthorized passengers on the freight trains. In spite of the most rigid efforts to solve the problem, the situation was not improved, and finally a number of native patrolmen were stationed along the track with strict orders to arrest any person jumping on or off a moving train.

"Something less than a day later one of the guards stumbled into the Culebra station in a much-ruffled condition, dragging after him a vainly protesting captive. Both had evidently been through a rough-and-tumble fight, and there were unmistakable signs that it had not been finished to the satisfaction of either.

"A crowd gathered on the run as the guard

explained to the station official, 'Caught dis man hoppin' on dat train about a mile down de road, sah.'

"The prisoner endeavored frantically to make himself heard, but the patrolman threatened him into silence with his stick. 'He was half-way to de roof when I grabbed him, sah.'

"Again the prisoner struggled and again his captor produced the club. 'But I yanked him to de ground, sah, just as you told me, and here he am, sah.'

"With a desperate effort, the prisoner finally jerked himself free. He was the brakeman!"

The Panama Railroad of to-day is doomed. Within the next five years, possibly fifty per cent. of the line will be buried under water to a depth of from thirty to eighty feet. The destruction of the railroad's present route will be caused by the construction of the Canal, which for miles will almost overlap the rails.

Especially is this true at Gatun, where the yellow waters of the Chagres River will be shot from their present course to form a giant reservoir, with a rough area of one hundred and ten square miles. Within a span of hours, the village of Gatun, now boasting five hundred inhabitants, the encircling jungle, and the narrow ribbon of the railroad will

be buried nearly one hundred feet under the swirling stream!

With these facts in mind, a new route is being surveyed for the Panama Railroad, and work on a second line to replace the present road has already been pushed a substantial distance. In many features, the new line will outrival the engineering achievements of the original road-bed. Over ten million cubic yards of "fill" will be necessary before the rails can be laid in position.

At Gamboa, a 1320-foot bridge will span the Chagres. At Miraflores, a six-hundred-foot tunnel will be constructed, of which four hundred feet will be bored through the solid rock. At Gatuncillo, over three million cubic yards of dirt will be dumped onto the treacherous lowlands as a foundation for the road-bed.

It was originally intended to carry the new line across the Gatun Dam on a mammoth embankment, eighty-two feet high and seven thousand feet long. Borings, however, developed the fact that the foundation would rest on an insecure clay soil, and it was necessary to abandon the plan. To surmount the difficulty, the engineers were obliged to make a detour of from eight to ten miles.

From seven different points, four thousand

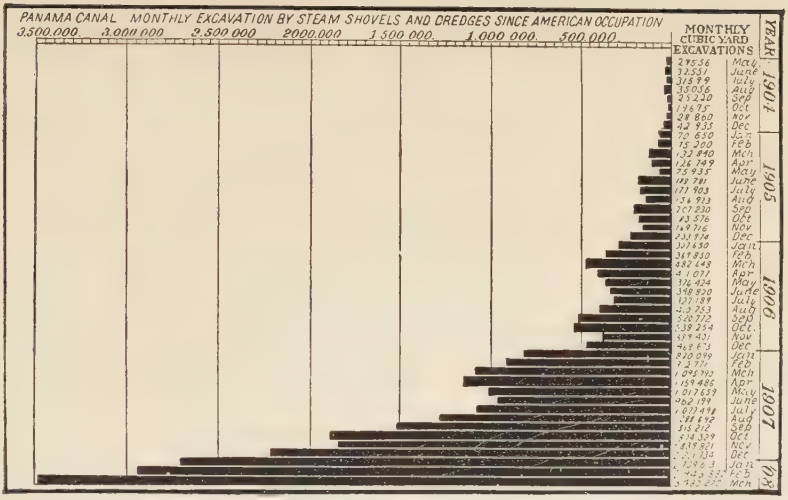
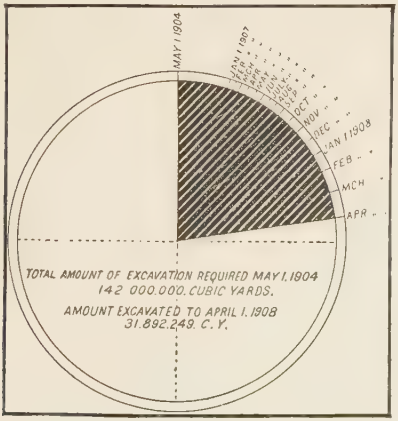


DIAGRAM SHOWING EXCAVATION DURING EACH MONTH AT PANAMA BY STEAM DREDGES AND SHOVELS SINCE AMERICAN OCCUPATION



WORK DONE, AND TO BE DONE, ON THE PANAMA CANAL

workmen are carrying the road-bed into the jungle, keeping pace with the Canal-builders as the completion of the giant waterway is brought nearer and nearer. Probably within the next four years the new line will be in operation. It is certain that if to-day's prophecy is realized, within this period the turbulent waters of the Chagres will bury the present Panama Railroad forever from the sight of man.

CHAPTER III

THE ROMANCE OF JUNGLE AND CITY

LIKE the harsh, metallic strokes of a hammer fell the words of doom:

"The prisoner is sentenced to die at sunrise, for conspiracy against the Spanish crown!"

Over the sixteenth-century Panama court-room dropped the silence of pulse-tingling tragedy. The bound man before the tribunal of justice straightened to a ramrod stiffness and his eyes shot a circle of crisp contempt around him.

Grimly, the cordon of musket-thumping guards closed about his shoulders, and Vasco Nuñez de Balboa—discoverer of the world's greatest ocean, he who wrote the first chapter in the white man's history of the Pacific—was led to the executioner's axe as a nation's reward for his world-stirring exploit.

I went one day to Culebra and Balboa's cliff—the crumbling pinnacle of bluff from which his eyes first swept the power-dazzling vista of the

TYPICAL FAMILY QUARTERS FOR NEGRO EMPLOYEES

Pacific, still as devoid of pathway as on that wild September day of 1513. Within a stone's throw, the steam-shovels of the Canal-builders were vomiting their tons of rock and dirt, and the crunch of air-driller and screech of locomotive and crash of dynamite blast were making day hideous.

"Gold Hill" the bluff is called, because of a legend which tells of tons of the magnet-metal under the roots of the palm trees. It is at the foot of the scarred cliff, where the Niagara-thunder of the Culebra Cut sweeps through the wilderness, that the hand-to-hand grapple of man and Nature reaches its surging climax—strangely enough, under that point where white men's eyes first saw its ocean goal.

From the discovery of Balboa, the Panama of the Pacific—the Greater Panama—dated its jungle-birth. Also with the winning of the Pacific, the winning of the golden land beyond the Pacific followed as a natural segment of the circle of conquest.

It was here that Balboa found the second feature in the two-edged climax of fame—and death.

On that day whose setting sun would have seen his expedition southward bound for the conquest of Peru, the demon of jealousy thrust a fatal pitfall in his path. The rival hand of Pedrarias

Davila, Governor of Panama, crunched heavily on his shoulder, and he was whirled shoreward and prison-ward as a menace to the power of Spain.

Had he outflanked the malice of his rival, his heel would have been at the throat of the Incas a full decade before Pizarro; the rifled wealth of the Andes would have been at his feet; and two continents would have grovelled before his sword. He would have been master of the Pacific even as he had been its discoverer.

Shrugging his shoulders, the engineer in newly laundered white duck, who had been recalling with me the story of Balboa's end, stared out over the straggling half-moon of present-day Panama, as we lounged on the veranda of the Hotel Tivoli. From our vantage point, the yellow city glared at us—a great blotch of sun-baked color, sprawling between the green billows of the jungle and the blue shadows of the ocean.

"What a tale it could tell!" mused my fancy-roaming historian. "What a tale of men's bravery and men's knavery, of blood-lust and gold-lust, of naked blades and naked passions!"

He whirled toward me, the tilted match at his cigar-end forgotten.

"Balboa was but one man in four hundred

years of daring men, who have fought and won—or lost—on Panama soil. Old Panama was the Gibraltar of the New World. The wealth of two continents poured through its gates!"

"Yes?" I probed, with the memories of my Prescott sharply astir.

"Spoils of Spanish conquest. Panama was the natural transfer point to the Atlantic. It was the jogging mule-train across the Isthmus, with its gold bars and ingots, that led to the Canal of to-day."

My companion's voice tingled with a crisping emphasis. "Before the trail of the steam-shovel came the trail of the sword. Panama was baptized by the blood of the explorer and the fire of the buccaneer before it reached the concrete of the engineer. Behind the Panama of the Canal, the Panama of Shonts and Stevens, of Goethals and Roosevelt—have you ever tried to picture the Panama of Columbus and Balboa and Pizarro? Ay, and the Panama of the sea-rovers and the sea-spoilers,—when the Isthmus was swayed by the Spaniards and flayed by the pirates—Drake and Morgan and their daredevil crews?"

My historian came abruptly to a pondering halt. In silence we stared down the circle of the hill driveway, dissecting his words as we

watched a razor-boned cab mule come lurching toward the hotel steps.

"One, then, should carry a pocket-Prescott for an appreciation of the real Panama?" I suggested finally.

The engineer took eager issue.

"Not at all! Nature has written the story more vividly than man. Follow her scars of the past. They will speak to you more eloquently than a dozen volumes!"

They did. And what a seething panorama they rolled before me! Not until the statue of Christopher Columbus in Colon harbor faded from my view, and the steamer shaped her course for that other statue in New York harbor, which men call Liberty, did I realize the real significance of the words.

I had followed the crafty Pizarro to the jungle-buried stone tower, where he offered victory-beseeching vows on the day of his departure for the conquest of Peru. I had emulated the pillaging Morgan in his climb to the age-wrecked dungeons of Fort San Lorenzo, which the buccaneer had won over the bullet-torn bodies of half his men. I had searched the serpent-breeding walls of old Panama, blackened by the torch and reddened by the sword of the pirate-conquerors—

where the cowled priests of the Inquisition had swayed two continents by the whispered horrors of the underground torture chambers.

By the rim of the Atlantic, I had explored the site of abandoned Porto Bello, rotting under the talons of the jungle—the festive market-centre of the seventeenth century, where the plunder of the north and the south had flowed to the Spanish galleons, where had come the hawk-eyed merchants of the Old World and of the New, the swash-buckling cavaliers, and grovelling mountebanks, and painted women of fortune, and rollicking sailors, and chained slaves, and blanketed Indians, each with a rôle in the swirl of the wilderness-drama, the prologue to the twentieth-century romance of the Canal.

Athwart the time-mellowed kaleidoscope of Porto Bello, flashes also the present-day menace of San Blas. Curving out into the surf of the Atlantic like a ragged turkey's foot, is the mysterious land-point which the veteran Panamanian nears with narrowed eyes and knitted brow. Behind its frowning tree-belt dwell the famous and infamous Indians who have made the name of San Blas blood-red in Isthmian history.

The bronzed wanderer of the tropics tells you that the San Blas natives are the only unconquered

tribe of red men in modern history. Never have they bent the knee of homage to a foe. Only a dozen miles from civilization, never have they acknowledged the yoke of the white man, maintaining always a bullet-emphasized defiance.

Skirting that wilderness-territory which they call their own, the San Blas braves early in the days of the Spaniards drew a dead-line. Armed sentries were posted through its windings to halt the invader with a warning or a bullet. Never have they been withdrawn. It is a tradition of the Isthmus that a white man has never remained alive in the San Blas territory without an Indian escort.

In appearance, the San Blas native is the absurd opposite of his martial reputation. He is seldom over a squat five feet in height, wooden-faced, wooden-jointed, slow of speech, slow of action, with stolid eyes dropped vacantly to the dust.

In a morning ramble through the Colon market place I spent half an hour of sharp gestures and sharp words in a wasted effort to draw a cocoanut vendor from the San Blas region into conversation. He was master of pidgin-English, voluble enough with his muddled words when I asked the price of the wicked-eyed parrot at his elbow, but a post when I ventured the subject of his people and his

history. When a Panamanian half-dollar dangled enticingly before his eyes failed to open his lips, I knew the task was hopeless. Later, I found that the effort is always so. The San Blas Indian has never broken the rule of silence.

In the smoking-room comradeship of the steamer I chanced to meet the white man who has probed deepest into the secrets of the San Blas wilderness —who has the name of having rubbed elbows with Death in more guises and from closer angles than any other man in bullet-humming Panama.

And yet for days, my shipboard digest placed him as a harmless botanist or missionary. There was nothing in the man or in the name to show that he had wrested a dozen fortunes from the jungle, or that he had tramped daily and bunked nightly with Death in doing so. Can you picture Joe Black—mining engineer, gold prospector, Indian-fighter—a short, soft-voiced, diffident man, with a slow, shy smile, much given to corner dreaming, a hesitating, retiring figure in his felt hat of Quaker breadth, precisely fitting black suit, and low-cut "lay-down" collar?

While the gray twilight shadows were slipping over the deck one evening, he wistfully unrolled a crumpled, long-packed Confederate flag. Rather than lower it after Appomattox, his father had

gathered his war-thinned family and made a new home on Mexican soil. Caressed by the silken folds was the much-thumbed photograph of a young woman. The smiling features were those of an Aztec princess, descendant of the conquered Montezuma, who rules to-day the jungle-survivors of the perished nation, huddled in the eastern mountain-fringe of Mexico.

It was not until our last evening that I found she was his wife. What story throbs behind that strangely mated union, I never knew. When I left him in the Jamaican moonlight, he was buried with his thoughts and his romance, staring silently out over the silver waves.

It was Black who told me of the wilderness gold of the San Blas country, less than a score of miles from the Canal, which for centuries has mocked the white man's greed.

"Six months ago, I sent an exploring party into the San Blas gold-belt," said Black abruptly, as his restless hands locked themselves over his knee. "Six weeks ago, my men came back to me—ragged skeletons. Two of them were limping with bullet wounds. Twice they had fallen into the hands of the Indians. On the first occasion they were marched out of the country at the point of the rifle. On the second, they were bundled into a

TYPES OF MARTINIQUE WOMEN ON THE ISTHMUS

canoe and set adrift in the Atlantic—without oars. If they had been caught a third time, it would have meant death."

"Did they go back?"

Black looked at me wonderingly.

"Of course; they are American engineers—and their work was n't done."

He sipped his cola thoughtfully.

"Did they find the gold?" I asked.

The little man across the table nodded simply. "The richest placer gold found in Central America for years. 'Millions in it,' probably—just beyond our reach."

"You mean——"

"On the map two inches will take you from Panama to Venezuela. As a matter of disagreeable fact, four of five hundred miles of unknown jungle lie between the Canal Zone and South America. The San Blas natives live at the edge. If they were attacked, they would retreat into a wilderness which a white man has never traversed. To conquer them would mean the loss of four or five thousand lives—on the part of the conquerors. In the meantime, the Indians are masters of the gold supply."

When Black spoke again, it was to utter a prophecy in that curiously grave voice of his.

"Some day, one of the greatest gold-fields of the globe will be found in the Central American jungle"—he paused with a strange smile; "but the man who finds it will probably leave his bones on the spot! If I were free——"

But he didn't finish the sentence. The blank was more eloquent than words.

On a day when the rain-crisped morning breeze was whipping the waters of Colon harbor, our motor-boat zigzagged oceanward from the dock, bound for the orange ball of the sun and the underground dungeons of San Lorenzo. Under a high pressure of gasolene, the jungle fortress and the mud village at its foot are a sharp two hours' run from the Colon water-front.

To within half a mile of the foam-churned shore our boat wormed its way, and a native dugout, with a trio of shirtless rowers, carried us through the breakers to the fringe of sleepily nodding palm trees and the gaping circle of villagers and dogs.

It was here that the pirate crew of Morgan made hostile landing in the sword-slashing year of 1670, bound for San Lorenzo's arms—and treasures.

It is a ribbon of a path that twists downward from the moat to the ocean edge, with frowning tree clumps and jagged boulders at every turn—

THE FORT AT ST. LORENZO, PANAMA

and in the days of Morgan a garrison of three hundred men behind the walls at the end. As we slipped and stumbled up the ragged trail, the difficulties of attack loomed larger and larger.

Half a dozen determined men behind that mass of rock at the right, for instance, where the green lizard is blinking, or crouching on that ledge at the left, where you see the clump of orchids, could hold a hundred at bay. Yet Morgan carried the fort and put the garrison to the sword in a short day's work!

A sharp, right-angled turn of the path carries you from the gloom of the trees to the summit of the Chagres bluffs. Before you, so near that you recoil, tower the three-hundred-year-old walls of San Lorenzo, weather-blackened, vine-hidden, moss-caked—as grimly massive, in spite of the ravages of Nature, as when they faced the ravages of man. Yawning at your feet is the weed-choked moat, and just at your elbow the lowered draw-bridge and arched gateway are crumbling to decay.

Half a dozen steps within sprawls a broken pyramid of rusted cannon-balls, still in that spot where they were heaped by the doomed garrison two centuries and a quarter ago. Just beyond, is a jagged patch of great swaying weeds, a man's

height above the ground—in the shadows suggesting the last, desperate stand of the Spanish soldiers before the onrush of the buccaneers.

The shrill voice of my guide brought me sharply from the past to the present. Between his jabbering words, the Indian was pointing alternately to the ground below him and the rude brush torch in his hand. Turning with a grin, he swung briskly off into the blackening shadows at the rear. When I followed uncertainly, I found him beyond a downward bend of the wall, holding a cautious match to the uneven torch. At his shoulders, the mouth of a descending tunnel was thrown into vivid relief by the yellow flame. With a silent gesture he stepped backward into the darkness.

When I reached his elbow, the tunnel had broadened into a long, narrow, underground chamber, and dripping water spattered on the stone slabs at our feet. As we stared forward, there came from the shadows a sudden, sharp flapping, like the shaking of a dusty rug. The next instant, a rush of flying bodies scuttled by our torch. We had disturbed the dozing bats.

Now I was beginning more clearly to appreciate the details of the chamber, and the series of yellowed iron rings on the wall, toward which the native was nodding. I took a step nearer, then,

another, and held the rings in my hands. They were the leg-irons with which the Spanish tyrants had bound their prisoners.

Through the shadows stretched a long, grim row, riveted to the stone blocks with heavy, round-headed spikes. As I bent my head, I saw that the opposite side was lined in similar fashion. I had found the subterranean torture-chamber of the Spaniards. Here chained men had rotted to a ghastly death, losing reason—let us trust—before life. It seemed to me that I could trace the grooves in the rough floor made by their frenized limbs in their death-struggles. Never was daylight more welcome than when we stumbled out into the clouded courtyard.

"There the ghosts come," muttered my guide, with sweeping arm extended toward the watch-tower that squatted upon the wall.

"Sometimes, when the night falls dark, and the wind is strong, they walk by the cliff." As he dropped his torch, he crossed himself very gravely.

Ghosts? What a logical thought to carry from this fortress of eternal twilight!

Secretary Joseph Bucklin Bishop of the Isthmian Canal Commission was summarizing musingly the show-points of special interest at Panama.

"The savannah drive, by all means," he said

finally. "Yes, you must take the savannah drive. This is the ideal approach to the Panama that was. The original city was destroyed nearly three hundred years ago, you know, when Morgan raided the Isthmus. The present site is six miles farther north."

It is impossible, however, for a carriage to reach the jungle-ruins of old Panama. The last mile must be covered on foot, through a winding path of red clay, while you leave behind the vehicle which has carried you past rippling savannahs dotted with the homes of the wealthy Panamanians, Paris-educated mulattoes.

Beyond the four roofless walls of the ruined tower of St. Augustine, the city which once ruled the Pacific is traced only by straggling heaps of masonry. The pirates did their work of destruction well. And yet it was through a freak of fate and not through force of arms that their pillage was made possible.

When the buccaneers appeared in sight of the walls of Panama, the garrison sallied beyond the gates to give battle. In the city was a drove of restless cattle chafing for lack of food. As the pirates advanced to the attack, the Spaniards cut the ropes and turned the surging animals loose upon the hostile column. The musketry, however,

had fired the intervening brush. Suddenly a leaping wall of flames stretched itself before the charging cattle. The animals were forced to a dazed halt, and then turned back in greater frenzy than before. To and fro, among the panic-stricken Spaniards, they pounded, their plunging hoofs driving the garrison in hopeless route, as the buccaneers, with victorious shouts, forced their way through the flames and into the defenceless city.

Thus did Panama the Golden, the swayer of the western continent, meet its end.

To go back to the halcyon days of the dead nations of the Intecs and the Aztecs, and put a value of millions upon the treasure-trove whose golden current wound through the Panamanian jungle, is much like trying to read in the dark. The men who have spent a life among the hieroglyphics of stone and parchment tell us that the necklaces and bracelets and anklets of those erstwhile masters of the western continent, if thrown on the modern market, would bury the twentieth-century output of precious stones. It is certain that when the Aztecs and Toltecs held Mexico, gold was more plentiful among them than copper is in the United States to-day. Authentic history relates that often the most

common household utensils were fashioned of beaten silver.

It is a conservative statement that the loot which flowed through old Panama was as great as the expenditure for the present-day Canal. Many authorities would place the amount much higher. It is reasonably certain, however, that the plunder wrested by the Spanish sword from the Montezumas of Central America and their brethren of South America would reach five hundred million dollars.

Nor is this the most startling angle of view. Historians unite in the statement that gigantic as was the loot of the conquerors, the treasures hidden by the conquered—which have never been found—were fully ten times as great!

The man who knows the tropics first-hand receives as unvarnished truth the tales of buried cities and buried treasures, which the modern American digests as the fanciful dreams of a novelist who has been burrowing into Mexican history. There are a dozen mining engineers at Panama, whose paths have led southward into Peru or northward into Mexico, who will tell you that the tattered Indian trying to sell you yams or bananas could lead you to hidden mines rich beyond the visions of man. Prescott will tell you the same,

Registered in Panama, 1907, by W. A. Fishbaugh, Empire, Canal Zone

THE PROMENADE ON THE SEA WALL, OLD FORT, PANAMA

if you delve into the ponderous volumes he has given to the subject. Even the greed of a Pizarro or a Cortez failed to find all of the jungle wealth of the kings who once ruled above and below Panama the Golden.

And again, when the Spaniards met the conquerors in their turn, the sword of the buccaneer missed millions where it found thousands. To cheat the pirates, great chests of gold and silver—bound for the court of Spain—were cast fathoms deep into the blue waters of the Pacific. When the doom of Panama was seen, three galleons, heavily laden from the Peruvian mines, were anchored in the harbor. Within an hour, great, ragged holes had been chopped in their bottoms by the crews, and they were sunk forever from the sight of man, bearing their sword-won treasure with them. We were drifting over the spot in a Government scow when I heard the story.

There are other tales of similar trend that you can find by the score. Every man who has tramped the tropics a year has another which he thinks is new until he meets the man who heard it twenty years before. Occasionally, you find the story that has come true and hear the tale of the treasure that was found, but not often, for the

craft of the red man and the white man who swayed Panama in the days of long ago was deep and subtle and picked its hiding-places well.

CHAPTER IV

HOW THE "DIRT" FLIES AT PANAMA

HOW big is the Panama Canal, not in puzzling mechanical specifications, but in easy-jointed, square-toed English? When all is said and done, how fast is it really being dug? What have the Americans actually accomplished since the flitting of the French? What is the Canal going to cost and how is the money being spent? How is the waterway to affect the map of the world when it becomes a reality? And what is it going to mean to you, an American citizen?

A battery of sharp-spiked queries—what facts will it drive home? Listen!

Every two minutes a ton of coal is burned up at Panama, every minute twelve carloads of rock and gravel are torn from the earth, every hour 1666 pounds of dynamite are exploded in mountain and jungle, every minute $124 is spent for labor!

One hundred and sixty-seven locomotives are

shrieking and creaking in the nine-mile ribbon of the Culebra Cut,—10,000 shirtless men are sweating and swearing,—1250 flat-cars are rumbling and grumbling! One hundred and six miles of track split the gorge—a dozen sets of rails, in a width of 200 and 300 feet, are hung in tiers one above the other. Sixty-seven steam shovels are plunging twenty-ton scoops into the earth two and three times every minute. Over 2,000,000 cubic yards of earth are being wrested from the rainbow strata of soil every thirty days. And on the two sides of the inferno squat the twin peaks of Gold and Snow Hills like a couple of apples which a schoolboy has nearly bitten through.

Roughly, a hole measuring 97,515,000 cubic yards must yet be bored in the Panama clay to make the Canal a reality. When the French were routed, 81,500,000 cubic yards had been excavated. The Americans have added 42,000,000 cubic yards to this total.

Picture a chasm measuring 125 feet in every direction, in which could be buried twenty-five ordinary three-story houses forty feet in height, in width, and in length. The equivalent of such a chasm is bored every day along the course of the Panama Canal—the excavation amounting to nearly 2,000,000 cubic feet daily.

From still another angle, let us view the marvel of the great waterway. Loaded onto a train, the earth from the Canal would fill twelve cars every minute! One flat-car, thirty-eight feet in length, would be loaded every five seconds! An average day's excavation would fill 5868 of these cars. Coupled together they would make a continuous train thirty-four miles in length. If it were placed on the rails at one time, it would extend very nearly across the Isthmus. If the rear car were at the Colon station the engine would be approaching the city of Panama. Of course you are familiar with the city dump carts. The "dirt" flying from the Canal would fill 183 of these carts every minute. In less than six minutes over 1000 would be groaning under the weight of the Isthmus clay.

Let us bring the statistics of the Canal home with us. If the earth excavated during one year were dumped down in the city of New York it would cover completely, to a depth of twelve inches, that portion of Manhattan Island extending from the North to the East River and bounded by Fifty-ninth Street and the Battery. But we have not done, for there would be left enough to form a blanket over the entire area of Central Park—five feet thick!

Allowing a monthly excavation of 2,000,000

cubic yards, which arose twice to 3,000,000 during the year 1908, the actual digging at Panama should be completed in four years' time. This statement allows no margin for accidents and views the 30,000 workmen at Panama as so many automatons, moving with clock-work regularity. When it is remembered that they are gathered from the four points of the compass—men who cannot talk to their neighbors on the right or on the left—and dropped into the heart of an untamed jungle, under a tropical sun, the difficulties of maintaining clock-work system can be appreciated.

As to the question of concrete: To the average man, the word calls to mind the contents of a seven- or eight-foot trough, mixed by a pair of perspiring carpenters with spattered hoes. In the swirl of twentieth-century activities, the concrete house has come to rank as a rival to its neighbors of brick or wood. Can you keep such a house of concrete in mind for an instant—one perhaps thirty feet square? Now, I am going to try to bring the Panama Canal to your town. The concrete used in the three giant lock systems —Gatun, Pedro Miguel, and La Boca—would build 22,842 houses of eight rooms each, with two stories and a basement!

If your town or city has a population not exceeding 125,000, the concrete of the Panama Canal would furnish the material for houses sufficient to accommodate every person! Suppose each house were set on a seventy-five foot lot. The combined dwellings would line three streets, reaching clear across the Isthmus of Panama with the Atlantic Ocean washing the back yards at one extremity and the tides of the Pacific flooding those at the other. Even after both sides of the streets were filled, there would be enough houses left to reach almost half the distance again.

Transferring these statistics to "the States," we could fill both sides of a street extending all the way from New York to Philadelphia, with enough dwellings left over to line one side of a street from the Quaker City to the Capital. Or, going westward, you could fill one side of an avenue reaching from St. Louis to Chicago, or you could extend your street from St. Louis to Kansas City, or almost to Cincinnati!

Much of the earth taken from one part of the Panama Canal is used to build another part. This is not true of all of it, however. Thousands of carloads are turned into the swamps and morasses in whose green depths are bred the fever-bearing mosquitoes of the Isthmus. The

importance of this fact comes with sledge-hammer force in the statement that, in 1906, one hundred thousand grains of quinine were consumed daily in Panama as a protection against disease! The excavated earth has filled the pest-holes and has thus materially aided those measures of the sanitary campaign that have reduced the quinine rations by two thirds!

Beyond the partly accomplished work of excavation, looms the giant task of constructing locks and dams. The Gatun Dam, alone, has a surface measurement of 1,000,000,000 square feet and a depth of 787 feet! Nature, harnessed, will perform the bulk of this project through the turbulent waters of the yellow Chagres. A period of two years in the Canal total will cover man's contribution to this feature.

Jot down the final item in the problem, the locks and the deep-water jetties, and the date which has been set for the completion of the Big Ditch—the latter part of 1914 or the early part of 1915—assumes the proportions of reality.

When the Canal Zone concession was obtained from the Panamanian government it cost $50,000,000 in cold cash. It has required $75,000,000 more to dig the Canal to its present point. Congress appropriated $30,000,000 for the expense of

the year ending December 31, 1908. Optimists place the total expense at $300,000,000. Pessimists do not pause short of $500,000,000. It is probable that in the end the Canal will mean a per capita cost of at least five dollars for every one of the 80,000,000 inhabitants of the United States.

And for what are these millions being used?—for what are they going to be used?

A payroll of $1,434,000 has to be met every month—in a year's time, an expenditure exceeding $17,000,000. This item for employment alone, remember. At the last census, Uncle Sam was giving work to 31,924 men. It is costing anywhere from $150,000 to $250,000 a month to protect the health of Panama. In an average month the sanitary department costs $200,000. The expenses of the civil administration present a monthly total of from $53,000 to $67,000. More than $100,000 a month is being spent in municipal improvements.

A gingerbread trimming, this? Perhaps—but it must be remembered that the Panama of to-day is literally built on a pie-crust over a seething pest-hole. Ten years ago, some fifty men in every 1000 were dying annually from the tropical death vapors. Just as in war time a heavy detachment of scouts and pickets is needed in the

enemy's country, so in the battles of peace at Panama a wide line of outlying sentries is necessary in the grapple with the disease germs. The elaborate sanitary department and the system of municipal engineering may be money thrown away—but it is either money or lives. And it is greatly to be doubted if the lives would be forthcoming with the same readiness as the money!

About $500,000 is spent annually for coal. Up to the present time, over $8,000,000 has been expended for new buildings. It requires about $115,000 every twelvemonth to protect this property from fire. The expenses of equipment pass the $1,000,000 mark every thirty days.

And so the money flies even as the "dirt" flies at Panama. But dollars will not dig the Canal. The French had the money and they spent it. I recall, for example, an item of some 20,000 snow-ploughs which were shipped to the Isthmus during De Lesseps' régime. The rusty machinery can be seen even to this day by the curious—stored away in a territory where the average temperature is 110 degrees! This is how the French spent their billion of francs. Even the most habitual growler will admit that the Americans are at least doing better than this.

Divide the bulk of Texas by eight and the result

will be the area of the republic of Panama. Through a territory of 32,800 square miles is a straggling population of 360,000 people. The seeker after accuracy, however, will elevate his eyebrows at once. As a matter of fact, the population of Panama is confined to one third of the gross area claimed by the republic. Probably one half of the country has never known the foot of a white man. Nine tenths of it is frowning jungle.

In a span of half a block in the city of Panama, I read, in fat-lettered English, squatting billboard advertisements of a popular make of overalls and a much-lauded brew of beer—in clumsily traced Spanish, I spelled out the announcement of a coming bull-fight and a Sunday evening lottery. Such are the two civilizations of the Canal Zone.

On the one side of the dusty cars of the Panama Railroad, I bought a morning newspaper. On the other side, I looked through the windows into a bamboo hut, with naked black children and green lizards and grinning monkeys.

In the union of these two civilizations, with a trackless jungle before and behind, Uncle Sam's Canal-builders are making new engineering records every week and smashing them next week

like eggshells. And it is because they can do so that they are achieving that which other generations and other nations have for centuries labelled the impossible—the joining of the world's two greatest oceans.

CHAPTER V

COLON AND BEYOND

ASK the man who has spent a knock-about day in Colon what is the city's chief characteristic, and he will point to his splashed boots and answer with a surly growl, "Mud!"

And he is right. It has ever been so—and ever will be. It is as though Nature had made the city with a blot and no one had been able to erase it. During eight months of the year it rains at Panama, not as we know it at home—not at all! The rain-maker at Panama labors with a steady, relentless, unswerving will as though he belonged to the steam-shovellers' union of the Canal and was working each month to beat his record of the month before. And of the Panama rain, Colon receives at least two thirds. At least that is the way the visitor feels about it.

Yet they laugh at umbrellas at Colon. As a matter of disagreeable fact, an umbrella is as little protection in a Panama deluge as the paper

lantern fluttering in the little Japanese bazaar at your elbow.

So after all, the mud comes as a matter of course. And by the time you have plodded through the market-place and along the dreary length of Front Street and across to Cristobal and the rain-dripping statue of Christopher Columbus, you are used to it—if you are a philosopher.

Colon is long and low and flat. There is a squat half-circle of hills off at your right but they are not high enough nor sharp enough to change the colorless perspective. The city doesn't put itself out to interest the traveller. It goes on the yawning theory that he ought to be able to entertain himself, so with the exception of the bronze statue of our old friend, Columbus, somewhat the worse for wear, and De Lesseps' palace in the same vicinity, also the worse for wear, Colon has no public attractions. And always the city impresses you as just awakening from a sound sleep and still engaged in digging the tag ends of troubled dreams out of its eyes.

From all of which it may be inferred that Colon is apt to be disappointing. It is even depressing—discouraging, if you are gauging the republic of Panama by the impressions of its Atlantic gateway. This is not fair, however, either to your-

self or to Panama—for Colon is as far from the kernel of the Isthmus as the shuffling Jamaican negro is from the Paris-educated, Paris-clothed mulatto of the Panama savannahs.

Colon is not so different from certain thriving cities of the North in the fact that its business activities are confined to one street. And the one street is appropriately named. Stray from Front Street and before you have gone half a block you will be stumbling through the city's back alleys.

Also Colon does not believe in sky-scrapers. Most emphatically not. In the whole length of Front Street, there is not a building over two stories in height and the majority, the great majority, do not rise above the first story.

You have not finished your first block before you are aware that the Japanese have cornered the business market. Look where you will, you will find that every other merchant, banker, and even gingerbread peddler is a son of the Flowery Kingdom. Front Street is made up of a dozen blocks of shed-like, disjointed stores on the left-hand side, which, if you be artistically inclined, you try to imagine as "bazaars"—on the right-hand side are eight or ten rows of rusty, weather-worn freight cars, the majority forgotten in their

solitude, with a few joined to creaking, complaining engines blowing an asthmatic way along the rim of the blue-gray Atlantic, whose soggy docks are perhaps a stone's throw distant. Over at the side, you can trace a clump of nodding palm trees, wet and forlorn against the slate sky—the chief touch of the tropics in the circle of the rainy afternoon.

The American engineers have made seven-leagued strides in the task of municipal house-cleaning at Colon. The pavement of Front Street presents a surface of even, well-set brick, while the more important of the side streets are gradually partaking of a similar dignity—a vivid contrast to the squalor of the littered alleys to the right and left. It is much as though a vigorous broom had been at work in an attic, and had left heaps of refuse at the sides and in the corners, while the centre had been brushed clean.

As we pause in the shelter of a corner store, where an assortment of bead ornaments compete with a stack of native skins for our patronage, a spick-and-span wagon from the Government commissary clatters down the street, a vivid contrast to the nondescript vehicle of the Colon cabman lurching behind. A brown-skinned Panamanian girl, with a scarlet ribbon in her black hair,

offers us a wooden platter of ginger cakes and cocoanut candies. A Colon policeman—his five feet two inches as stiff as a ramrod—whirls his stick idly as he saunters by in his dripping blue uniform. Inside the open door of the bazaar, a swinging parrot sputters strange oaths at us, while a solemn-faced monkey in the corner tries to catch our attention with his pranks. We are beginning dimly to realize that we have reached the American Canal Zone—and that it is a foreign land.

A brisk walk of half a dozen blocks, however, changes the picture completely. We step from one civilization into another—almost from one century into another. We have gone from the sleepy Spanish city of Colon to the wide-awake American settlement of Cristobal.

An invisible boundary divides the two, in its way, however, as distinct and emphatic a deadline as was ever surveyed. Colon is a part of the republic of Panama. It is governed by Panamanian laws, dozes its time away in Panamanian shiftlessness, and is bound hard and fast by Panamanian customs and Panamanian traditions. The first step into Cristobal whisks the visitor into an aggressive American atmosphere with a bewildering abruptness.

Cristobal is of course a town built very much in a hurry. The Government quarters, which line its macadamized streets, are for the most part square, four-family houses of the type which we would call at home "summer cottages." A heavy gray curtain of mosquito netting is hung from the top of the second-story veranda to the ground, imparting a strange, ghostly effect as the tropical gloom deepens and the electric bulbs of the corners burst into yellow flame.

Cristobal has a modern fire department, a modern police force, modern schools, and modern churches, all located in buildings similar to the summer cottages of the residents. Also in Cristobal is found the first of the Y. M. C. A. buildings —the Government club-houses—which dot the Isthmus from the Atlantic to the Pacific and where the social life of the jungle finds a lively centre.

To digest Colon and Cristobal properly, it is necessary first to digest the Pacific sweep of the republic of Panama, and approach the Atlantic port from the interior—with the activities of jungle and Canal as a background against which the Isthmian shiftlessness and American aggressiveness are given a new significance.

A dozen years ago, Colon was a waste of yellow

mud, in whose slimy depths lurked the unchecked germs of jungle fever, slaying with equal impartiality native and foreign. That a city—however crude and incomplete—has been erected from the slime is a feat deserving of underscored mention in the story of the world's civilization-builders. And it is a feat whose difficulties and possibilities cannot be measured until the tourist has first filled in the background of the Canal.

We see few evidences at Colon of the greatest artificial waterway in the world's history. If we are seeking signs of the progress of the Canal, we will carry with us the impression of a blank slate if we go no farther than Colon.

It is with these facts emphasized in his mind that the average traveller shakes the Colon dust from his feet at the end of a one day's stay at the Atlantic port, and resigns himself to the ordeal of the Panama Railroad in the bumping journey across the Isthmus.

There are seven trains daily from ocean to ocean although only three from Colon. The tourist may cross the American continent in a space of from three to four hours whether he choose the early morning train, that at noon, or the final schedule in the late afternoon. It is this last which we select, and as our watches hover

around the hour of 4 P.M. our car rumbles out of the Colon station, and we know that with luck we will eat dinner within the sound of the Pacific surf.

We have a ride of something over three hours ahead, with the heavy tropical darkness on us before we reach the end, but if we settle into our seats with a yawn we are apt to be sharply aroused.

A railroad journey across the Isthmus gives us some rapid-fire scenic changes. We are compressing the 2500 miles of the trans-continental journey of "the States" into fifty miles. Let me sketch for you the picture from our car window.

At one side of the train is a station easily taken for an American suburban depot, the kind you find in almost any of the smaller towns at home. At one end is a modern American news-stand, with the late magazines hanging over the counters as you see them in the booths of any of our own newsdealers. Up-to-date trucks and baggage equipment are scattered about the platform. It is in fact a little slice of home set down here in the heart of the jungle—and for a moment we forget that we are in Panama.

And then, as we turn our heads and glance out of the opposite window, the picture changes like a lightning flash. Bordering the track on the

other side is a bright-colored wall of jungle foliage —tall, arching ferns—great coleus plants, with their leaves splashed with the tints of the rainbow —luxurious cannas with their red-spiked flowers— climbing air-pines with their soft-shaded, blue blossoms—wonderful specimens of the orchid family ready to burst into bloom six weeks later with their wealth of lavender and purple and pink petals—and over all, the waving fronds of the graceful palms.

At one side, a yellow stream cuts through the foliage, from the bank of which we can see nothing but a slippery shelf of black mud. Squatting on the shore and wading knee-deep in the current are a circle of bronze-skinned Panamanian women and spread out before them is the family washing.

Wringers and washboards? They would stare at you in amazement and disgust if you mentioned these articles. Smooth, round stones take the place of the washboard as we know it at home, and instead of our time-honored wringer, rough, knotty paddles are being wielded vigorously— for the women of Panama have a most substantial muscle!

With strong, sharp strokes the paddles are raised and lowered, sending the water from the soaked clothes in a little cloud as the washing

is hammered and pummelled into a twisted, compact mass.

"Button-breakers," they call them in Panama, and certainly the name is an apt one.

The bank is a cesspool of mud, the water is murky and discolored from the red clay, but mud and clay make no difference in the plans of the washerwoman. And anyway a little mud more or less is not regarded as a crime in Panama.

Within a hundred feet are the two halves of my picture—civilization and savagery, jungle and clearing, the primitive customs of the black man and the modern progress of the white man.

And such is Panama through its whole length and breadth, as I was to find, the footprints of Uncle Sam's seven-leagued boots showing with startling distinctness even where the wilderness is the darkest and the most forbidding.

Here stretch roughly cleared fields where a forlorn looking horse is trying to browse, often up to its knees in the soft, sticky mud, so that from the train it looks no larger than an overgrown dog.

Over there is a thatched bamboo hut, half hidden among the trees, with a kinky-haired girl crushing maize before the door, a group of naked, staring babies rolling through the coarse grass, and a stoop-shouldered native woman, with her hair bound

up in a gaudy handkerchief, watching us from the doorway. We see two or three hairless Mexican dogs yawning as the train whistle rouses them, a great white cat arching her back with a green lizard waddling after her, half a dozen grunting, ring-tailed pigs nosing in the clay, and over in the corner a freshly cut stack of cocoanuts, and here and there the ashes of a rude, brick fireplace where the scanty cooking is done.

This is the heart of the jungle—where the poorer Panamanian dozes his life away.

At one side of the track is a great mass of rusty, twisted railroad ties and weather-beaten, dilapidated engines and machinery—the relics of the French days at Panama, the last of the old-style equipment with which De Lesseps was to complete the waterway in record-breaking time. Millions upon millions were spent in the purchase of these engines and ties and shovels only for them to be cast away in the jungle for the storms to ruin and the reptiles to haunt.

They are useless now. Their only good is the object-lesson they serve to give in the reckless extravagancy which has made France the most frivolous and most headstrong nation in the world—the dreamer among her hard-headed neighbors.

We are scarcely twenty minutes out from Colon when we catch our first glimpse of the Canal. Away off to the left, looms an indistinct mass of men and machinery, half-hidden behind a great bank of red-clay, with the steam from a puffing locomotive floating off into the air above.

But it is only a vague, fleeting view. The next moment, the trees hide the scene, and we crane our necks for the next corner of the "Big Ditch" to loom in sight.

Now we slacken speed as we approach a winding switch, branching off into the jungle. Lurching down the rails, comes our first "dirt train," an engine and eight swaying freight cars—"gondolas," a railroad man would say, great open cars with no roofs and little sides—loaded to overflowing with the red-hued clay of the Canal, with here and there a sharp, jagged boulder showing where the dynamite has gotten in its work.

Later we are told that these tons of dirt disappear almost as rapidly as they are excavated, in the building of the great dams and locks of the waterway, and the filling of the slimy stretches of swamp lands—where, before the Americans came, mosquitoes by the thousands were bred almost in a night.

PRESIDENT ROOSEVELT ON TOUR OF INSPECTION AT EMPIRE

But we are nearing the city of Panama, and the end of our trip across the Isthmus.

With a lurch, the train rolls into the Panama station, and we stumble toward the door with our baggage. Our first glance is enough to show that Panama differs decidedly from its sister city of Colon. From the moment we emerge onto the platform and wend our way through the depot, which is beginning to put on metropolitan airs, we are sharply aware of this fact.

At the outer edge of the station, the jangling Panamanian cabs are backed onto the walk so closely that you take your life in your hands when you thread your path among the wheels and clamber into a seat. But you accomplish the feat at last, the driver clangs his big bell, the horse jerks forward, and you are driven over the dusty pavement and up the broad, winding hill beyond, which leads to the American section of Panama, Ancon, and the beautiful Government hotel, the Tivoli.

It was here that I found Secretary Bishop of the Canal Commission, and a cheery smile of greeting flashed over his face when he read my letter of introduction from President Roosevelt.

It was a smile that promised a hearty reception and I at once began to picture a lively round of sightseeing. Nor was I mistaken.

"The most wonderful feature of the Canal is of course Culebra Cut," said Secretary Bishop. "How would you like to go through it, in our motor car?

"Is half-past five to-morrow morning too early for you?" he continued. "If possible, I would prefer you to take the first train to Culebra, where the car will meet you."

The Panamanian motor car is operated on the track of the railroad and is quite capable of reaching a speed of—well, I was to find that we could tear down the line at nearly a mile a minute! But the bulk of its travelling must be done in the early morning before the dirt trains, with their tons of clay, monopolize the road.

"All right, sir, I 'll be on hand," I replied to the question—and I was.

CHAPTER VI

THROUGH CULEBRA CUT—ON A MOTOR CAR

THE cheery beams of the tropical sun were already streaming into my room at the Tivoli when the jangle of the alarm-clock aroused me. The sun and the Americans are early risers in Panama, I was to discover. It is during the morning that by far the greater share of the work is done on the Isthmus.

From Panama to Culebra is a distance of nearly twelve miles. The Panama Railroad does not endeavor to cope with the speed of the trains at home, and it was three quarters of an hour after our start before I alighted at the Culebra station.

As I glanced uncertainly around me, a young man with a cheery voice hailed me from the edge of the platform.

"I am Major Gaillard's secretary," he announced. "If you will come with me, I 'll take you over to the car." Major Gaillard is the division engineer, in charge of the Culebra section of the Canal.

It was in a cubby-hole of a garage, bordering the line of rails, that we found the motor. Peterson, chauffeur, machinist, and all-around man of information, was awaiting us with a broad grin of welcome.

"Ready?" I asked.

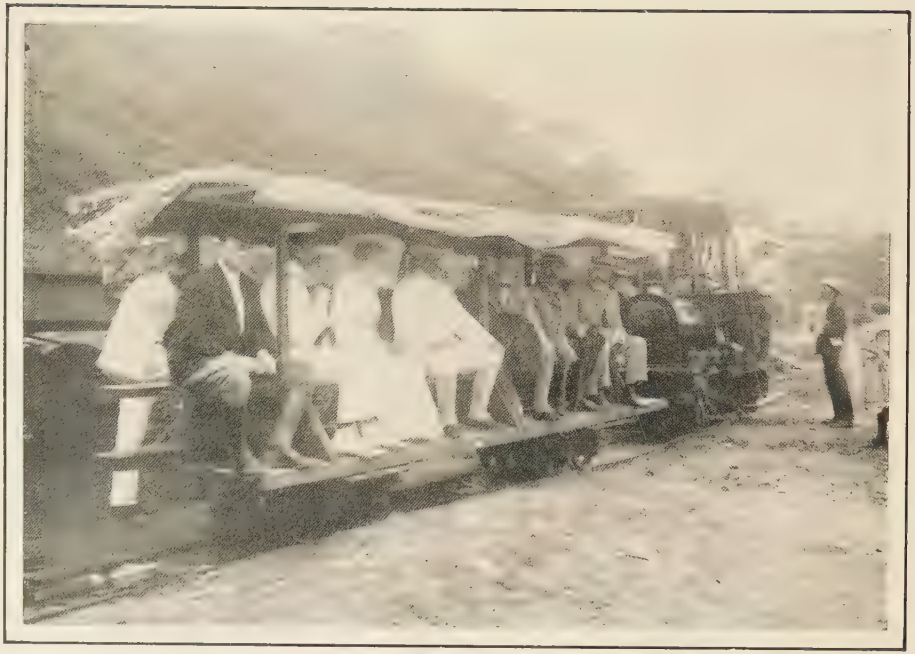
"In two minutes," he replied. "Here, Jim!" he called sharply, and his black boy sprang to his side.

"Turn-table!" continued Peterson briefly. In a moment a series of cleverly grooved planks were joined together in front of the motor, and the car was run onto a neatly revolving wooden track. As smoothly as clock-work, it swung around and the motor was gently deposited on the railroad, ready to spring forward at the touch of a lever.

"All in?" called Peterson curtly over his shoulder. Bending forward, he switched the starting gear into place, the car darted swiftly down the rails, and we were off.

We swung past the Culebra station, every moment adding to our speed. The morning air was whipping our faces with a pleasant, invigorating thrill, and the spirit of the swift dash was beginning to take firm hold of us.

Peterson slackened his pace as we neared the switch beyond and hurriedly crossed his hands



PRESIDENT ROOSEVELT ON A TOUR OF INSPECTION

out over the side of the car—the silent signal to the workmen ahead that he wished to change into the adjoining line. On his side Jim was duplicating the action, which was soon to grow familiar to us.

It was at Whitehouse, a small dot of a station between Culebra and the neighboring point of Empire, that we again swerved our course, and Peterson cried, "We are entering the big Cut now. Keep your eyes open, Jim!"

The need of the warning was soon apparent. Within the space of the next eight miles over one hundred locomotives were backing and switching, often barely grazing each other as they darted to and fro in the swirling mist of their own steam. A collision might come at any moment even with the experienced hand of Peterson guiding us.

Attached to scores of the engines were long rows of dirt cars, partially filled, every moment adding to their great loads of clay and rocks.

"There are more men killed on the Panama Railroad dodging dirt trains than from any other cause," Peterson grimly informed us. Which was pleasant intelligence, as we darted down past the bumping rows of swaying cars and they darted down past us, the motor and the trains really

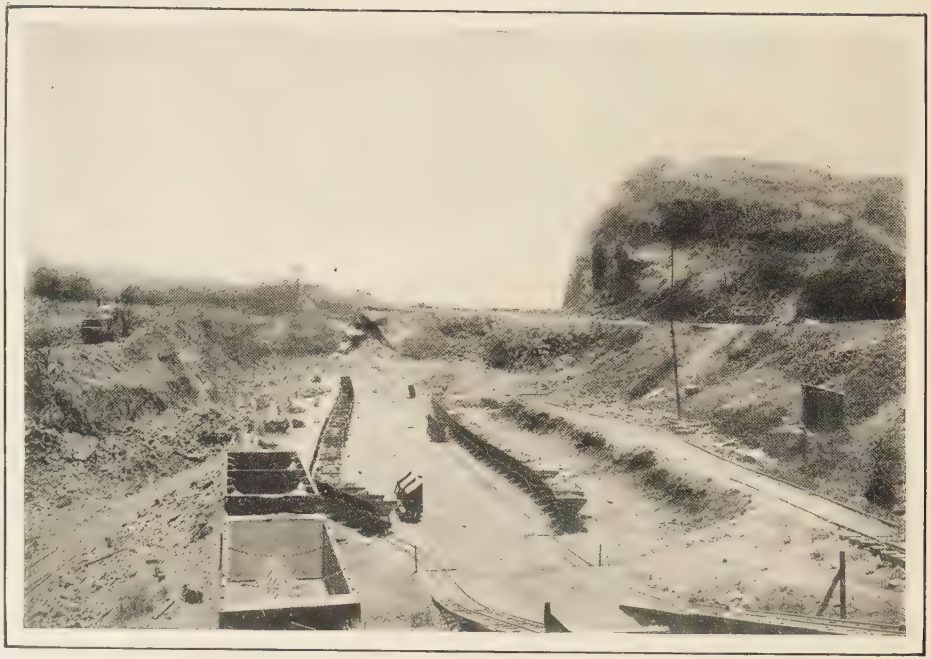
playing an exciting game of "hide-and-seek" or "prisoner's base."

The towering walls of Culebra Cut were now rising above us, their great, rugged faces seeming to scowl in baffled rage at the army of sweating men below, who day by day were ploughing deeper and farther into their sides.

For centuries these great, swollen mountains had defied the assaults of men, laughing at the efforts to bore a passage through their rocky ridges. And now the men, in their turn, were laughing at the efforts of the bullying mountains to check their advance.

Have you ever studied the picture of a noted battle-field? Do you recall the thick clouds of smoke, the spurting cannon, the stacks of rifles, the heaps of dead and wounded men?

Change the field of battle to Culebra Cut. You will see the same thick, black clouds of smoke. Instead of the belching cannon, you will find a hundred times more deadly instrument in the giant dynamite blasts. The monster steam shovels, the great levellers and air-drillers are the weapons of warfare, and the opposing forces are the armies of man and Nature. It is not one battle, but a series of daily battles, and they are all to the death.



WEST SIDE OF CANAL AT BAS OBISPO, SEPTEMBER 19, 1907, BEFORE FIRING 9600 POUNDS OF BLACK POWDER

Hundreds of men, thousands of men are before and behind and around us—black men, white men, yellow men, red men—men with their coats and shirts and collars off, with grimy hands and perspiring faces and straining shoulders—men to whom a dozen different languages might be addressed without finding their native tongues.

Over all tower the great, scowling cliffs, before you is the constant swirl of brown smoke, and on every side the screech of shrill locomotive whistles, the hoarse shouts of toiling men, the grinding crunch of the steam shovels.

Peterson turned suddenly as we worked our way in between the overhanging cliff walls—our speed was now little more than a bare, zig-zagging crawl—and cried crisply, "We're coming to one of the largest steam shovels on the Isthmus. Do you want to stop?"

In answer to my nod, the motor paused and I sprang out onto the ground, at close quarters with my first steam shovel.

If you can imagine pounds magnified to tons and can conceive of a monster iron scoop that can handle these tons as easily as you can handle an ordinary baseball, if you can picture such a gigantic machine so cleverly constructed that it is possible for one man to swing the great

dipper where and when he pleases, you will have a dim framework of the American steam shovel as it is operating at the "Big Ditch." Can you go a step farther and imagine the man placed in such a position that he is hidden from view, the monster scoop seeming to work of its own accord—a great, rough creature of iron and steel suddenly given the power of life?

If you can, you will have an even better idea of what the steam shovel really is.

I clamored across onto the half-filled dirt train beside the motor that I might get a closer view. As I did so, the iron dipper struck a mammoth boulder half buried in the red clay below.

Deeper and deeper, its four iron teeth worked their way into the sticky mud at the base of the great stone. The boulder suddenly leaned over under the weight of the scoop and then, as I gasped, it was lifted bodily from the ground—wedged tightly between the gaping iron jaws. The shovel gave a terrific upward jerk, and almost before I realized it, the huge stone was being suspended in the air above my head.

"Jump!" shouted Peterson from the motor. "Great Scot, man, that boulder weighs twenty tons!"

I did n't wait for additional explanation.

With the most rapid side step I think I have ever made, I sprang to the ground, and none too soon.

The next moment the flap of the dipper opened, and the boulder dropped into the flat-car with a dull thud.

But it didn't stay. Hardly had it settled on the clay when it turned on its side, rolling ponderously toward the ground.

The steam shovel was n't idle, however. With a slow awkward movement it again swung around, its iron edge striking the rock with a force that carromed it sharply over in the other direction. And then, as though the boulder were suddenly fired with electric energy, it plunged off toward the opposite end of the car, every instant gathering new force. Again the steam shovel worked around, and this time with a resounding jar dealt the giant slab of granite another blow.

The boulder's course was abruptly checked, but only momentarily. A third time it commenced to roll, plunging toward the ground with even greater velocity than before.

It was a thrilling crisis for the layman.

With a jerk as though it had gathered all of its energies for a final spurt, the great shovel pivoted about, hesitated as if measuring the most effective

spot at which to strike, and literally grappled with its granite opponent.

The boulder's massive strength drew a ringing crash from the iron dipper, but it had brought up against an obstacle it could not move. It was vanquished. Slowly the steam shovel withdrew, hovering in the neighborhood a moment, ready for another attack. But the stone was firmly lodged this time. The dipper had done its work well.

"How many miles of track would you guess have been laid on the Isthmus?" queried Peterson as our car threaded its way beyond a more than usually active row of dirt trains.

"Possibly a hundred," I suggested.

He laughed as he shook his head.

"You will have to multiply that number by four—and then add some," he rejoined. "There are 448 miles of rails in Panama—in a distance of just forty-seven miles. In other words, we often have twelve and fifteen tracks in a row. There are fully this many before us now."

During a lull in the activity around me, I glanced at the cliff above. Its scarred, jagged surface showed nearly every color of the rainbow. Here was a surface of gray, there a bright scarlet hue, yonder a line of tan, to the left a dark slate color,

below a flaring yellow—the blending outlines of the different strata of dirt uncovered in the ever-deepening excavations.

"There is the famous Gold Hill to our left," explained Peterson.

"Gold Hill?" I repeated.

"The point from which Balboa discovered the Pacific," the chauffeur added. "The ocean is twelve miles from here," he continued. "You can see it easily on a clear day—but I would n't care to have had Balboa's trip to reach it, eh?"

I wondered curiously what the explorer's feelings would have been could he have pictured the present scene in Culebra Cut. Assuredly he would have termed the steam shovel a fabled giant lurking in the Panama wilderness like the dragons of old.

It was easy to see now that we were approaching the end of the great Cut. The cliffs had broken off sharply, and the number of workmen had abruptly lessened. Peterson brought the car to a sudden halt, the turn-table was again brought into play, and we were switched off at right angles to begin our circling way back to Culebra through the dark undergrowth of the jungle.

Faster and faster grows our speed. Now the wheels seem fairly to be burning into the rails, and

we tear through the heart of the wilderness at a speed that is eating up forty-five miles an hour! There is a clear track ahead, our white flags are held stiff against the breeze, and for the moment the thrill of the wild dash is our only sensation.

At our side the trees shoot by like a solid wall—we catch a confused glimpse of an occasional monkey chattering impudently at us, the sweep of a bright-plumaged bird, and the flash of a flower, but we have no time for details. We almost feel that we are devouring space.

It is barely half-past ten, and we are scheduled to board the 10.45 train for the Gatun Dam, thirty miles down the line. This thought is in Peterson's mind, as he jerks out:

"We'll make it nicely!" And we did.

CHAPTER VII

SCORPIONS, TARANTULAS, AND THE "T. T.'S"

WE had just time to shake hands before Peterson turned the speed lever and darted back down the switch to the garage.

It was nearing one o'clock when our train pulled into the Gatun Station, and we descended to the platform. A negro driver was awaiting us in the big Government wagon, and he cracked his whip merrily and urged his mules into a lively gait as we clambered inside.

We reached the Government hotel in time for luncheon and the warm greeting of O. T. Marstrand, the genial assistant supervisor of "Labor and Quarters," who had been assigned to meet us.

In the rain we set off to see Gatun, a compact little toy village perched on the side of a steep clay hill. Through the mess kitchens and sleeping quarters of the white and black workmen we made our way—spick-and-span buildings where a stray

thread or clot of dust, catching the keen eye of the inspector, would cause as severe a rebuke as in the regular army itself.

It was in the mess kitchen of the white, or "European laborers" as they are officially termed, that we recorded a startling incident not on our programme.

The supervisor, W. T. Virtue, had been explaining to us, in his brisk, businesslike way, the details of his interesting department when he reached over his desk and held up to view an empty lye can.

"Here is an unique curiosity," he smiled as I took the can gingerly.

I thrust back the cover, holding it in my left hand as I peered within. At the bottom crouched a shining black spider—as I fancied at first, except that it was three times as large as any spider I had ever met before.

"What is it?" I queried, as I continued to gaze at the strange object with a curious fascination even while some vague instinct sent a shiver of repulsion through me.

Mr. Virtue in answer thrust a long, slender stick into the can.

Instantly the spider sprang into motion. A bead-like tail darted toward the stick with lightning speed.

THE CUT AT BAS OBISPO, LOOKING SOUTH, JUNE, 1908

"We have a genuine specimen of the deadly black scorpion before us," announced Mr. Virtue quietly. "Its sting is certain death! There is absolutely no antidote. If your finger had been that stick——"

At that instant, the crouching scorpion leaped toward the top of the can, its tail distended, its body a-quiver.

With a gasp I dropped the receptacle onto the table, snatching my hand away just as the spider struck at the spot where it had rested.

I had been within three inches of death!

In spite of the dense humidity and the fact that a moment before I had been perspiring, I suddenly felt a cold chill.

"A close shave," muttered Mr. Virtue as he clapped the cover shut. "Almost as narrow an escape as you could experience from our friend over here."

As he spoke, he extended another can, and, deftly throwing back the lid, revealed a furry, black-gray creature within, apparently devoid of the power of motion.

But as he thrust his stick toward it, we saw a startling change. With a rapidity rivalling that of the scorpion, the occupant snapped outward

and upward, its ugly little body working convulsively.

"Allow me to introduce the tarantula," continued Mr. Virtue; "you will find him almost as ugly a customer as the scorpion. There is just a possibility of saving the life of its victim, if prompt measures are used. In the case of the scorpion, however, there is no hope. The person who feels its bite is doomed."

It was on our return route to Panama, while the lurching train of the Isthmus Railroad ran a race with the setting sun, that we met a quartet of the sun-browned men of the jungle whom the vocabulary of the tropics calls "T. T's."

Real "soldiers of fortune," with an emphasis, are these big-hearted men of the great out-of-doors, whose cheeks are tanned by the four winds, whose shoulders are broadened and muscles hardened by long toil in the forests and mountains.

These are the men who prefer a tent to a house, who have built the wonderful railroads of the jungles, who have constructed bridges in countries that have yet to know a railroad, who have located the rich gold and silver mines of the earth that are making new millionaires each year—the men who because they have drifted from one end of the wilderness to the other are dubbed in

the language of Panama "T. T's," or Tropical Tramps.

There are scores of these men at the Canal whose varied experience is tested to the utmost in the problems of excavating and transporting the millions of cubic yards of dirt and clay from the great waterway and the handling of the steam shovels and dynamite that are tearing their way through rock and jungle.

Our friends of the "T. T.'s" are already beginning a lively chat, as one divests himself of his khaki coat, and they settle into more comfortable positions for the trip. There are four of them—Turner, the civil engineer, who has passed the last four years in the wilds of old Mexico—Bradley, railroad construction boss, who has the reputation of getting more work from the lazy Jamaican negroes than any other man in the tropics—White, mining engineer, who has visions of the future gold mines of Colombia—and slow-speaking Endicott, who has been into and out of more scrapes in the Central American jungle than you could tell about in a large-sized book. As their big brown hands close over yours, and their eyes light up with that electric smile which is bred in men who have lived long on the outskirts of civilization

and the borders of nowhere, you know that they are glad to meet you. Just the sort of companions you would choose for this trip across the Isthmus, eh?

"I imagine you have some thrilling adventures with dynamite down here," I suggested as the conversation lagged.

White half closed his eyes.

"Dynamite is the most dangerous plaything that man ever handled," he responded, "and yet when a chap carries a fifty-pound case around with him every day for a year or two, he somehow forgets that Death is grinning at him over his shoulder.

"I remember an incident of a few months ago. We were standing on the edge of Culebra Cut watching the steam shovels below us. A short distance off, a gang of workmen were getting ready to discharge a blast. The alarm was given as the fuse was lighted, and those who happened to be in the neighborhood suddenly remembered an engagement elsewhere.

"You know the sort of silence that falls around you when something big is about to happen? Well, for a minute you could feel the stillness.

"And then right under us there came a lounging West Indian negro down the track,

STEAM DRILLS AT WORK IN BAS OBISPO

carrying a big case of dynamite over his shoulder, shuffling along with his head down. Somebody shouted at him, but he did n't glance up. Farther and farther down the ties he kept on, every step bringing him nearer to the sputtering fuse.

"Suddenly he stopped and drew out a bright red handkerchief. As he wiped his perspiring forehead, he coolly deposited the powder case on the ground and sat himself down on it—less than sixty feet from the blast!

"In another moment the deadly powder would be reached by the creeping flame, there would be a deafening roar, and then—Great Scot! What would happen to the men in the neighborhood if the negro's dynamite case should explode? Somebody gave a husky shout, but it was too late.

"From the side of the Cut came a crash as of a dozen cannon, there was a great swirl of rising smoke, a scattered shower of granite and dirt—and then we saw a jagged rock hurtling through the air directly toward the man below us. Whether he, too, saw it or not, we never knew.

"As straight as from a rifle, the boulder crashed down upon his skull, his bandanna dropped from his nerveless hand, and he sank limply onto the ground, dead. There beside him was the case of

dynamite untouched. The rock had been swerved aside by the human head and had just grazed the box with its deadly contents. Another inch to the right or left, and no power on earth could have averted an explosion which might have claimed dozens of victims!"

For a moment we were silent. Bradley was the next to speak.

"About as near a squeak, that, as an incident I remember," he said, reflectively. "One day I was standing near a blast which happened to be unusually powerful. With the explosion a perfect shower of rocks of all sizes was blown from the earth. Two or three of us were cut by stones, and when we shook ourselves out of the trance and looked around, we saw that the roof of the railroad dynamite station at our side had been smashed in by a great boulder. It had crashed from the rafters to the ground below—and was lying wedged in between three cases of powder, without having exploded any of them! Around it were stacked a thousand pounds of dynamite. A shade more force, another inch or a fraction of an inch difference in its fall, and we would never have known the power that struck us!"

Endicott, over by the window, aroused himself.

"Something like the escape I had," he told

us. "We were sitting around the dinner table, without a thought of anything out of the ordinary happening,—in fact, an unusually quiet meal. Suddenly there was a deafening explosion.

"'A big blast, that!' I said, carelessly, and went on with my eating. The next instant there was a jar above us as of an avalanche and as I pushed back my chair the table before me was buried under a great, muddy boulder! Through the roof was the round, jagged hole where it had entered, and before me was the wreck of the dinner, a vivid indication of the narrow escape I had just experienced. If I had not instinctively ducked, I would have been lying under the splintered table, dead or dying.

"The rock, we found later, had been blown a distance of a quarter of a mile by the blast which had dislodged it from the red clay, where it had probably reposed for centuries."

CHAPTER VIII

A DAY WITH THE PANAMA ALLIGATORS

"HIST!"

Captain Shanton bent forward eagerly in the bow of the boat and darted a quick, sharp glance toward the river bank.

I strained my eyes in the same direction in vain. In the silence of the waving cocoanut palms and tangled underbrush I could make out nothing.

"Back, men, back!"

The Captain's crisp order broke the stillness abruptly. The Indians tugged vigorously at the oars—the boat quivered, and then slowly receded. The next instant Shanton's rifle was at his shoulder.

"Quick, to your right!" he whispered, as I followed the direction of his musket. "There!"

"Why, that's only a dead log!" I cried in disappointment. "Surely you——"

The heavy report of the Captain's gun drowned my words. Again it rang out, and then a strange thing happened.

The drifting log ahead of us sprang literally out of the water! In that instant, I saw a cruel, yellowish-brown mouth at its end snap savagely open. I had seen my first alligator—at home.

Even as the thought flashed through my mind, I had jerked my Marlin to my shoulder and followed the Captain's fire. My first bullet struck the water at the side. At my next, the 'gator sank like a stone beneath the yellow waves.

"Good! you winged him that time!" shouted Shanton exultingly. "But we'll soon find a dozen others to take his place. We're going into the biggest 'gators' pool in all Panama in the next half-hour. Here, men, send the boat along. Straight ahead, around the bend there."

I thrust the eighth load home in my repeater as Shanton paused.

"That's right," he nodded; "you'll need 'em all, and need 'em badly before we're through. An alligator 's an ugly customer when your lead strikes him in the wrong spot."

Of a sudden the boat shot around the bend, and the stream abruptly narrowed. The brush on the banks deepened and the trees in places seemed almost joined together. Even the sunlight seemed less cheery.

Deeper and deeper we were rowing into the heart of the jungle. Did the gloom mean that we were nearing the alligators' pool?

Shanton turned in his seat and called back over his shoulder:

"I say, cut one of those cocoanuts for me. My throat's as dry as a cinder!"

We were beginning to feel the full extent of the humidity. The perspiration was trickling down the faces of the Indians in streams. I was suddenly conscious of a biting thirst myself, as a boatman reached toward the big stack of green nuts in the corner which we had taken on at a lonely bamboo hut nestling under the shadow of a palm tree at the Picara's mouth.

Have you ever tasted cocoanut milk? Not the thin, white fluid you find in the nuts of the Northern market, but the sweet, refreshing milk bubbling from the great husks as they are cut from the nodding palms of the tropics. If you haven't—well you have yet to partake of Nature's most delicious beverage!

The Indian's machete rose and fell in quick, sharp flashes and the heads of the two nuts he was holding on the boat's side were shaven cleanly off. A series of jerky gashes in the centre of each, and he held them over to us—"plugged,"

as the boys would say of a watermelon that had just been cut.

Inside we could see the cool, white milk, the husk forming a natural drinking gourd filled to the brim.

To drink from a cocoanut, while standing erect in a rocking boat, is an art requiring both skill and patience. I learned it—in time, and at the cost of a goodly portion of the fluid splashing over the surrounding neighborhood.

But our refreshments were to receive a startling interruption. A hoarse, guttural exclamation from the leader of our crew sounded behind us.

"Ahead, cap-i-tan, ahead!" cried the man, pulling in his oar. "'Gators, one, two, three of them!"

As we grasped our rifles, a second cry from behind caused us to look back.

Two more brown snouts had bobbed up at our rear. We had reached the alligators' pool—with a vengeance!

Bang! Bang!

The two reports of Shanton's gun were so close together as to seem almost the same explosion. The three yellowish-gray heads before us were abruptly lessened by one. Those remaining

were churning the water in their flight to the opposite bank.

Shanton's gun was working again. Behind us the other members of the party had opened a brisk fire on the alligators at the rear. A perfect fusillade of shots was ringing through the jungle. In a flash the stream seemed literally alive with the zigzagging animals. To the right, left, before and behind us, the wooden-like snouts dotted the river like a raft of logs torn apart in a spring freshet. We were in the heart of alligator-land in very truth!

As my eyes veered to the opposite bank, I caught a sudden splash in the water under a heavy screen of bushes. A long, brown head plunged out from the concealment, so near that I could see the dull, fishy eyes. At its side a second head issued into the sunlight, the slimy snout half-buried in the waves.

With a cry to Shanton, I sent my four remaining shots at the pair without lowering my gun. Before I fired the third, Shanton had joined me, the bullets tearing into the river and bushes in a veritable hail.

And then as abruptly as they had appeared—much as if a sudden signal of retreat had been sounded—the alligators vanished. Almost in

CANAL ZONE PRISONERS

a breath, the surface of the stream was freed of its savage occupants.

Strain our eyes as we would, not a trace of the long, muddy bodies could we find. The Picara was again a peacefully flowing stream, winding its way among the bright-colored underbrush, with never a hint of the deadly peril lurking under its current.

The barrel of my gun was almost blistering to the touch, as I reloaded. The party had discharged all of fifty shots in less than ten minutes.

"How many do you think we bagged?" I queried as the Indians sent the boat around in a slow circle.

"Anyway, half a dozen," was Shanton's answer. "We must have sighted at least forty animals all told. Remember if your bullet hits a 'gator in any spot except the fleshy part of his neck, it will hardly dent his hide. Probably ninety per cent. of our shots reached their marks, but it is not likely that more than half of them had any serious effect."

"How long after an alligator is killed before its body will rise to the surface?"

"In most cases, around twelve hours, I should say. I have known 'gators to come up within eight hours, but that doesn't happen often.

What is that native over there trying to tell us?"

At a discreet distance in our rear, a dugout had been following our boat, with three men leisurely handling the paddles. One of them was now standing erect in the frail craft, shouting across to us a stream of excited words in his broken lingo.

The leader of our crew translated clumsily.

"He says that for one dollar he will bring to the bank your next 'gator."

"How?"

The man in the boat held up a loose coil of rope and a long sharp-pronged harpoon.

"All right, go ahead," responded Shanton. "We'll shoot the animal—and you do the rest. The dollar's yours if we get our 'gator."

As it happened, it was my bullet that brought the animal down. It transpired in this wise.

A slippery stretch of black mud broke the line of tropical foliage at our side, jutting out in a queer, jagged spur into the water.

A moment before the river in this vicinity had shown scarcely a ripple. Then as my eyes carelessly returned to it, there was a sudden tremor in the waters—and gliding up the mud bank in plain view of the boat, a long, brown

alligator crawled boldly into view. Three shots I sent humming toward the brute. At the second he was sliding back into the water, at the third he had disappeared and was churning the stream into a heavy foam as though a big electric fan below were spinning furiously.

"Keep your eyes open!" warned Shanton in a low tense tone. "He's coming to the surface again in less——"

The prediction was verified before he completed the sentence. With a spasmodic jerk, the 'gator's head shot into the air, and our rifles spoke again. Slowly the animal sank from sight.

"He's finished!" cried the alert Shanton, as he scanned the surface intently. "You've given him his death shot! Where's that chap with the harpoon?"

But he was already rowing lustily to the spot. As the dugout darted ahead of us, the native was bent dangerously over the side, his eyes searching the water with a penetration which would have required a magnifying-glass for us to equal. In a decreasing line the boat circled around the spot where the 'gator had disappeared. The man with the harpoon called something in a low tone to his companions, and a long, light pole in the bottom of the dugout was extended to him. Rising

nimbly to his feet, he began a series of rapid soundings.

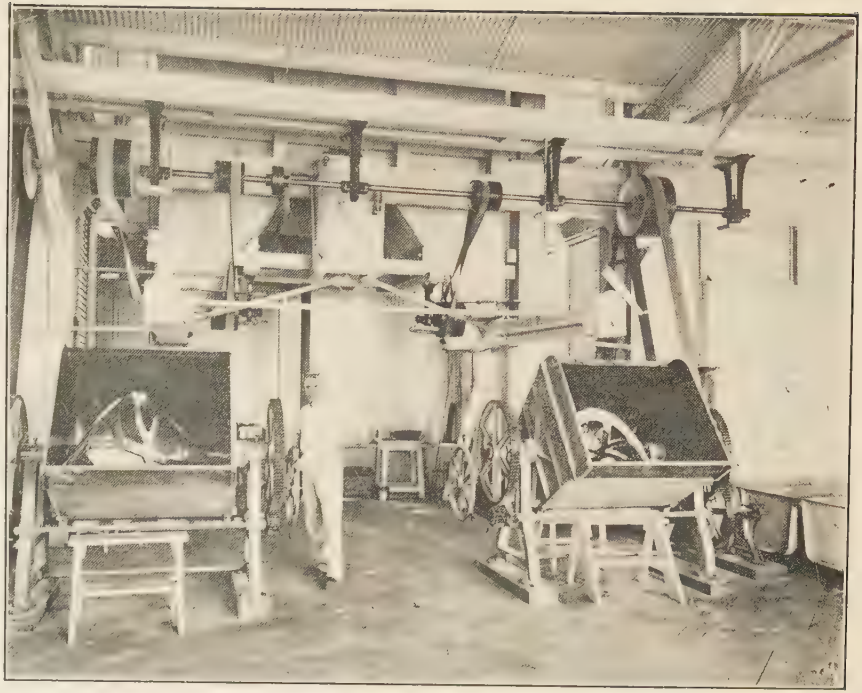
Was the alligator beyond his reach? Even as we asked the query, a cry of triumph arose. The animal had been located.

The sounding stick was transferred to another of the crew, and the man with the harpoon began deftly to unwind his rope. With the coil in one hand, he leaned over the side, lowering the iron hook slowly into the yellow depths. To and fro he moved it gently, now and then giving a sharp order to his companions.

Once the hook seemed to catch and then break off. The second time, it held fast and he straightened sharply with a motion to the others to row ahead. The dugout forged toward the bank, the rope in the water tightened abruptly, and the side of the craft was forced down almost level with the waves.

Both boat and hook were equal to the strain. The dugout righted itself—and the next moment the long, slanting head of the alligator came to the surface with a rush. The prongs were buried firmly in its great, fleshy jaw. With a thrill, we saw, however, that the beast was not dead!

In spite of the bullets which had ploughed into its neck, and the deep grip of the heavy hook,



THE BAKERY AT CRISTOBAL

the 'gator was still alive—quite able to cause an ugly scene. Nor did it lose any time in doing so.

The moment it appeared above the water, it seemed fairly to spring through the air toward midstream. The rope was twisted sharply around, the dugout whirled like a toy, and from the three occupants came a burst of alarmed shouts.

But the hook had too firm a hold for even the iron strength of the 'gator to break.

The natives, aroused to action, threw their combined weight against it; for an instant, it was a tug-of-war between beast and men, and then the ebbing powers of the animal gave way. Without resistance the 'gator allowed itself to be dragged again toward the bank, the boat grounding without its making the slightest movement.

No sooner had the foremost of the crew leaped ashore than he reached for his rifle. Pressing the barrel against the beast's great fleshy neck, he pulled the trigger twice in rapid succession. He was taking no chances of being caught in the alligator's teeth in its death-struggles.

We followed the natives to the bank as they were pulling the animal out onto the open ground.

"What do you say is its length?" asked Shanton as we sprang onto the shore.

"Possibly six or seven feet," I replied, thinking I had put the figure high.

"You're off, away off," laughed the Captain. And so it proved. From the tip of the 'gator's tail to its mouth was a distance of fourteen feet!

"We sometimes find them twenty feet in this neighborhood," supplemented Shanton. "This is the country of real 'gators down here, you know."

The better part of three hours still remained for us after lunch. Deeper into the jungle we penetrated, and then back slowly toward the river's mouth as the afternoon began to wane. But we had seen the bulk of our alligators.

Shanton sighted one animal in a sand clearing toward the end of the stream, and pumped three bullets into its neck so quickly, in spite of the two-hundred-yard distance, that it was killed instantly—a distinctive feat even for an experienced sportsman. With the exception of this incident, however, our trip back to the Pacific, and thence out to the Government scow—or "clapert"—was comparatively uneventful.

The tropical sunset was scarcely an hour away when we began our twenty-three-mile return journey up the rugged coast of Panama.

THE INTERIOR OF THE BAKERY AT CRISTOBAL

"How many alligators are bagged down here in a year's time?" I asked Shanton, as he finished emptying one of our few remaining cocoanuts.

"Oh, I don't know; several thousand, more or less," he replied carelessly. "I once knew a chap in Colombia, hailing from New England, I believe, who went into the 'gator business on a wholesale scale. During his first season he shipped forty thousand skins to the New York market at one dollar and seventy-five cents per, and the next year he raised the figure to sixty thousand. How's that?"

"You surely don't mean that he shot them all?"

"Well, hardly! He contrived a curious plan of killing the 'gators with a young chicken and a pointed stick. The animal was lured to the bank by means of the fowl, and when it opened its mouth to snatch the bait, the sharpened stick was wedged into its jaws. A stout rope had been knotted about the club, and the other end coiled around a convenient tree. The unfortunate alligator was thus as secure a prisoner as though it were surrounded by an iron cage.

"The New Englander captured so many 'gators by this ingenious method that he was enabled to retire."

CHAPTER IX

SHANTON—TAMER OF PANAMA

SHANTON'S long arms passed the newly opened cocoanut across to me, as the Indian dried his machete blade and cast an expert eye toward the stack of remaining husks in the boat's stern.

As the sweet milk trickled through my lips, Shanton sank back onto a crooked elbow, stretched his leggin-clad feet out before him with a contented sigh, and puffed solemn smoke-clouds toward the fronds of the palm tree overhead.

We had wormed our way a dozen miles through the Panama jungle after alligators—nor had our search been in vain. Sprawled out on the mud bank of the yellow Picara was the great, clumsy body of a fourteen-foot 'gator with a circle of our Marlin bullets criss-crossed in its hide.

I was watching the black-red blood dripping from its mouth when Shanton removed his pipe to speak of the Man with the Steel Muscles at the White House.

Always he is this to Shanton,—Shanton, who remembers him as he bunked and fasted and fought with him in the old Rough Rider days, and again on the frontier trails of the West when he was not President Roosevelt, but Roosevelt, the sportsman,—every inch of him! This was the picture that Shanton painted in our lounging noon hour in the wilderness,—the picture of a comrade, who beyond the President saw the Man. And the Indians, impatient, dozed and roused themselves, and dozed again as we talked.

When Roosevelt picked his man for peace-maker and peace-preserver at the Panama Canal, he searched the West and fastened on George R. Shanton, cowboy, deputy-marshal, Spanish War captain, prize "bronco-buster," and all-around graduate of the frontier,—that portion of the frontier where a revolver shot is the standard of eloquence. The President wanted a chief of police at Panama fashioned of red blood, not of red tape.

And he found him.

A smile of reminiscence sparkled on Shanton's face and his square chin seemed less square, as he unbosomed himself:

"A man with a big hand appeals to me. Mr. Roosevelt has a big hand, and he knows how to

use it. He brought it down on my back once with a muscle that almost floored me.

"It was on the day of my departure for Panama. I had called on the President and was about to leave, when he raised that great hand and clapped me squarely between the shoulders. I am no small man,"—six feet two inches in his stockings! —"but I felt that blow for an hour afterward."

"'I am sending you down to the Canal, my Colorado bronco-buster,' I heard Mr. Roosevelt say, when I recovered myself, 'to make good,—*to make good!*'"

Shanton gazed musingly out over the muddy Picara.

"I have tried to do so," he added, with a soldier's simpleness.

In the background of my fancy, I could hear again those crisply cut Roosevelt tones, "I am sending you down to Panama—to make good!"

A trio of monosyllables, three short, curt words, driven home like a nail under a hammer—and they sent a man into the jungle to face death many times and in many guises before he neared the goal to which they pointed. On his shoulders was the greatest burden it is given men to carry—the law; and as his destination he faced that region where in all American territory the lawless held

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most brazen sway. At his right and at his left was a wilderness, three fourths of which white man's foot had never explored. In its heart was a winding string of jungle-settlements, with a population of fifty thousand shirt-sleeved, sun-browned-men—from India and Indiana, New York and New Zealand, St. Louis and St. Petersburg, men who numbered forty nationalities, the best citizens and the worst citizens of all governments.

Panama has been the cesspool into which the human refuse of the globe has been dumped in ship-loads. The giant task of the New World has demanded men and the Old World, whisking a hurried broom through its prison cells, has supplied the Man but kept the Manacles at home.

Men with the clammy fear of the guillotine and the block and the gallows were pitchforked from the land of their birth—to find new victims in the wilds of the Isthmus. Thousands of them—the vomitings of a score of nations—were driven cattle-like into the hopper of the Panama Canal.

And in the smoke of the greatest engineering battle of history, the contagion of the scowling stream of Europe's cast-off citizens was not appreciated until it had found festering lodgment. When finally the gates of the Isthmus were clanged shut, the peril of the outlaw was locked within

its borders. And the project which it threatened was that which more than any other held the honor of the American nation, and which more than any other a jealous world was watching, hungry for the first sign of failure.

So much for the Men and the Menace which George R. Shanton, late of the Rough Riders, faced with the commission that named him police chief of the five hundred square miles of jungle through which the Panama Canal is to bore its way.

In a sentence summary, the task of Shanton was the taming of the Isthmus. Has he won or failed in its accomplishment? Five years ago, the bandit of Panama was a terror unchecked. The man with a wallet in his belt carried a gun in his pocket. To name the Canal was to name the zone of the greatest lawlessness from Colombia to Canada. What is the situation to-day? We hear much of the historical, mechanical, and political conditions of the Panama Canal. What are the details of law and order that we find at the Isthmus? It is a query which gives us one of the most amazing—and least known—chapters of achievement in the history of the giant waterway. Let me give you its skeleton outline as it was presented to me by the grizzled engineer as we stared into the starless silence of the

Panama night. We had been watching from the veranda of the Hotel Tivoli the winking lights of the city of Panama—yellow rings against the blue darkness—with the spell of this summer evening in midwinter stealing away our adjectives. Like the chill of a cold douche, shattering to fragments our sentiment, came the cynical sentence of the British attaché at the end of our row:

"What a night for crime!"

The engineer at my right brought his tilted chair to the floor with a sharp thud. "You're wrong," he shot back crisply. "The man with the sand-bag is taking the evening off!"

The attaché whistled softly. "I admit I'm new to Panama," he began, "but——"

The engineer brought the flame of his match to his cigar. "Then you don't know Shanton," he finished with a grin. "These are the nights when the Captain's hawk eyes never close—and every bad man from here to Colon knows it as well as he knows the time-table of the Panama Railroad. He would as soon think of going to work on a steam shovel as running into the Shanton vision."

The engineer met my stare with a chuckle. "Four and five years back we had the news of

a murder served to us for breakfast two or three times a week. To-day the police blotter of the Canal Zone shows as few crimes as any similiar extent of territory in the United States!

"More. Put our population at sixty thousand—outside the boundaries of the Panamanian government. Pick any city of sixty thousand in 'the States,' covering less than one fiftieth of our extent, and we will show a record of law and order just as good, and in some cases better. We can go even further. We have fewer saloons and less gambling in the Canal Zone than the average American city of twenty-five thousand!"

A musing moment slipped by in silence. "And this cyclone reformation," I gasped, "what has made it?"

"Shanton!" was the terse reply.

And as the circle of my Isthmus prowlings broadened and deepened, I found the name echoed with a grim persistence. The engineer had not exaggerated. In the forty-nine miles of American territory stretching from the Atlantic to the Pacific, I found only thirty-three saloons. Two years ago there were a hundred and seventy-five.

I searched industriously for the rioting, gambling games of the border and discovered but two,

A HUT IN THE PANAMA JUNGLE

and these in half-hearted operation. Yet the spirited reminiscences of the veteran engineer at my elbow drew glaring pictures of the roulette and faro dens of three years before with the attending knife-grapples and midnight debauchery. In the six months preceding my visit, there were but three murders in the Canal Zone and not enough burglaries to fill the fingers of one hand. Less than four years ago, within the span of one month fifteen knifed men were found—without the crime-statistics reaching the record mark!

These are naked facts. How have they been brought about? What has been the galvanizing power behind the statistics? To point my answer, let me first give you the story of Shanton and the contested election of ballots—and bullets.

It had been a campaign of unusual warmth even from the Panamanian view-point and upon the issue there hung the question of who should rule the sullen city of Panama and ride in the Mayor's carriage. Of course all this was of no concern to Americans, for across the official boundary marking the limits of Panama, Federal authority counts for as little as the King's command on this side of the Canadian border. When, however, the rifles of the less favored faction appeared to offset the votes of their opponents

and Yankee property owners began to cast uneasy eyes toward the Cathedral Square at every unusual noise, Shanton's department of khaki-clad men were given sundry curt words of command and Shanton himself, on his restless horse, "Topsy," galloped toward the polls.

As evening approached, the candidate of the minority became more and more boisterous and the crowd of supporters at his back, hired at so much the hour, surged up and down Avenue Central with ugly threats in their voices if not in their hearts. About this time the whisper reached the frowning Shanton that the Panamanian authorities would not object to a display of Yankee force if exerted in the right place and at the right time. A sudden surge forward of the crowd at his shoulders abruptly determined his plan of action.

Spurring his horse to the middle of the street, his hand swung back to his revolver, and his voice rang crisply out over the scowling faces before him.

"I will give you two minutes," he paused with a grim smile, "in which to disperse! You are well enough acquainted with me to know that I mean what I say!"

Shanton was alone. The nearest American

officer was blocks away and he realized that the crowd of mulattoes and Spaniards and Panamanians knew it as well as he did. But his frown was as sternly confident as though a regiment were chafing at his back.

The line of sun-tanned faces before him hesitated, wavered, then there was a sudden forward movement from the rear. The next instant there was an awkward rush toward the frowning man on the horse.

Shanton's revolver leaped into the air and a double spurt of flame shot from its muzzle. The rushing figures slackened their steps and then there was a low, sneering cry and they darted forward again. Shanton had fired over there heads. It was a moment of real crisis. Shanton still held his revolver poised but he did not press the trigger.

Touching his horse lightly with his heels, he backed the animal toward the curb, with his face and weapon toward the advancing crowd. The horse reached the walk, crossed it, hesitated against the window of a bazaar, and then, at a word from its rider, backed squarely through the panes. There was the crash of falling glass and then, as the muttering throng came to an astonished pause, Shanton brought his horse to a halt

half-way through the window. His revolver was raised a deliberate twelve inches.

"I am going to shoot to kill!" he announced grimly. "The man who is standing by the curb thirty seconds from now will feel a bullet in his body!"

The sentence produced its effect before it was finished. It was uttered with the crisp impatience of the man who means action, and his finger was toying with a disagreeable carelessness about a certain flimsy trigger. A dozen of the more exposed figures moved quietly into the background. At that moment there was a burst of lusty American shouts from the end of the block and a squad of mounted policemen spurred toward the leader in the broken window. It was the one point needed to complete the climax. The mob broke into a stampede for safety, and the threatened riot was at an end.

As a tribute to a man's personality, the incident is perhaps the most significant of the Shanton stories that are told at the Canal. Also as an illustration of one of the central factors in the taming of the Isthmus, it is illuminating. He who can command a regiment is rated a leader of men. He who can command a mob bears to the former the relation of genius to talent. And fifty

THE INTERIOR OF ISTHMIAN CANAL COMMISSION MESS-HOUSE, CULEBRA

thousand men in the heart of an untamed jungle are much more likely to partake of the elements of the mob than the regiment, and much more likely to respond to the decisive action which rules the latter and to chafe under the daily routine which disciplines the former.

But it takes genius to realize and emphasize this fact. Shanton has something over two hundred men under his command. They are nominally police but literally as far from the conventional policeman as a Western sheriff is from the "plain clothes" man on the city corner. They have thrown away the police helmets and the police uniforms. They wear khaki and broad Stetson hats. Likewise they have thrown away the policeman's distrust of his neighbors. They are friends with every man at the Canal with whom they can be friends.

Shanton has laid down no ramrod rules. If he had, one thousand men could not police the Canal Zone. He appeals primarily to a man's sense of justice. When this fails—and it does fail often—he appeals to his sense of force. There is a dead-line beyond which the Isthmus knows it is not *safe* to venture. When Shanton uses his gun, he does so not only with the certainty of a dead shot, but with the ease of a man who

is absolutely fearless. This is why he can handle a mob. This is why the outlaws of the Isthmus know that his hand is swift and deadly and consequently to be avoided.

Yankee justice in Panama is swift and unique. It possesses a trade-mark nowhere else duplicated. Up until a short span of months ago when the conventionalism of shocked jurists interfered, it was—ideal.

Panama above all else is an impatient country. When it does things, it does them in a rapid way. When a president is to be removed, the operation is performed and his successor pitchforked into office within a fortnight—or less. It is a country that does n't believe in delay except in matters of daily toil, in which perhaps it is not exceptional. Therefore when to the Panamanian restlessness we add Yankee energy, we can understand that the courts of the Canal Zone have been clogged but little with the litter of red tape.

Up until the fore part of 1908, the American residents of Panama proudly maintained that they had solved the jury problem—and they were right. Then the Northern courts stepped in and ideals were shattered. The Canal Zone had reverted largely to first principles in the selection and operation of its jury, and the first principles

were a little too blunt and perhaps too simple for the black-robed dignitaries of "the States," who seek to regulate the laws of a living generation by the moth-eaten rules of men dead half a century and more.

The Canal Zone instituted a jury of three—and it made sure that the three were men who knew the law and had no qualms about administering it. The trio were not laymen. They were not only acquainted with the dusty law books stacked to their right and left, but had a working knowledge of men. Also they knew the temper of the country and realized that they were there to enforce the law—not to pick flaws in it. They were too busy to wrangle over the interpretation of an adjective, and consequently the public was not bored with a long, useless trial for which the dear people had to pay.

To the opinion of the jury was left all questions from the stealing of a dynamite keg to the exploding of such keg—with malicious intent. If a man picked the pockets of his neighbor or took his life or stole his wife, the same jury passed upon the merits and demerits of the action with equal calm and equal force.

During my Panama visit, I remember that a prisoner was sent to the penitentiary for ten years

within six days after an aggravated highway robbery. Before the week was over, he had begun to serve his sentence! The Americans "at home" would call this "frontier justice" and shrug their shoulders at its "crudeness." In New York, the jury would hardly have been selected within this period—if the prisoner had a few thousands to drop onto the scales of justice.

In a characteristic letter from Shanton not a great while ago—a letter bare of superfluous adjectives, for the man writes as he shoots—I read the story of a thrilling chase through the underbrush of the mountains after a trio of skulking outlaws. It was true that most of the story appeared between the lines, but the affair was as vivid as a moving-picture film, for the crisp sentences of a man of action must themselves bristle with action. The outlaws were of mixed nationalities—apparently the worst features of half a dozen races in their make-up—and they had torn a whirlwind path from Culebra to Colon. In the end, they had pried up the tracks of the Panama Railroad for the playful purpose of watching the next train crash into the palm trees, which action—shorn of disastrous effects barely in time—was the clue which put the irate Shanton hot at their heels.

It was a stern chase and a long one. The Panama mountain range is a broken slice of the Andes and just as ugly and just as treacherous as the rest of the scowling chain. There are parts, in fact many parts, where a white man has never penetrated—and few brown or red men. It was toward these sections that the retreating outlaws were shaping their course.

It was a matter of three rough-and-tumble days and sleepless nights before the circle of pursuers corraled their prey. A storm of spattering bullets emphasized the beginning of the end. Desperate men with the certainty of the gallows at their elbows have small reason to care for their own lives or those of others. When the final rush of the Shanton contingent was made, the police reached their quarry in a literal baptism of lead. The last stand was an affair of clubbed rifles and bruised fists. It was a battle as desperate as any waged by the armor-clanking adventurers of Balboa on the same trail four centuries in the past.

When the bandit trio were reduced to the subjection of the Panama "nippers"—curiously enough no man in either the pursued or the pursuers being fatally hurt—Shanton prepared with the rough-and-ready carelessness of the great

out-of-doors for the next chapters of the drama.

"I now stand ready," he wrote grimly, "to execute the sentence of the law, of 'death by hanging,' just as soon as I am told to go ahead!"

Wherefore, the shocked jurists of "the States" would again hold up pudgy hands of horror and declaim against the roughness of the border, where a police chief having caught his prisoner proceeds to punish him while his crime is still warm in the public memory! Panama throws aside the technicalities of dead law-makers in dealing with living law-breakers. It believes in punishing a crime before the crime has been forgotten, that men who may contemplate a similar offence may know what to expect.

It was not till I stood in the heart of the Culebra Cut, where in all the windings of the Isthmus man and Nature are locked in their most desperate grapple, that I found the motive power of the canal—the army of toil behind the steam shovels and the dirt trains and the air drillers. In the thunder of the engines three thousand men in twisting, squirming rows—from the cliffs, snake-like coils of ants—were burrowing deep down into the red and yellow clay, now with their bent backs alone visible like the angle of a half-closed

THE OFFICES OF THE DIVISION ENGINEER AT CRISTOBAL

jack-knife, and again their faces bobbing up into the sun, grim and grimy and dripping wet with perspiration. As far as the eye could sweep the ant-men wound their serpent coils until they were swallowed by the bend of the scowling cliffs—rising and sinking, rising and sinking like the wash of a troubled sea.

And again, beyond the range of vision, they crept on even as the bead of flame creeps down the fuse, until the task-drivers, with the great blue-prints and circling compasses and strange rows of figures, brought them to the surf of the Pacific. And again, over through the lazy, nodding palm trees at the side, they thrust restless, clawing arms into the long, green stretches of the jungle, carrying two steel rails through the narrow path the machete chopped. Over these rails, rumbling, swaying rows of cars were to come, bearing the red and yellow clay and the great, jagged rocks torn up by the ant-men as their burrowings grew deeper and longer and nearer the two oceans they are to unite.

Blistered by the rays of the copper sun, smothered by the disease vapors of the jungle, bruised and battered and broken by the lash of toil, it is an army clamoring always for men, more men, with which to repair its torn ranks and fill

its gaping holes and reinforce its assaults on the red and yellow clay. Nor can it look beyond the sound limbs of its recruits. So that it assimilates men rough both as to hands and morals—and rougher in the wilderness with home a matter of thousands of miles beyond the palm trees. This is the Army of Brawn and Muscle, criss-crossed on the edge of Nowhere, that is digging the Panama Canal. To attempt to discipline this army by the starched laws of the well-groomed, well-mannered city of "the States" would be to attempt the impossible. He who would control such a body successfully must know men—in the raw, stripped of the veneer of polite society.

It is not in the day's work of the Canal that the police problems bristle. When men are driving their physical energies at top-notch speed, they have small opportunity for either restlessness or lawlessness. It is in the reaction following the daily toil that the germ of discontent is bred and men plunge into hilarious, ribald amusement.

It was not in the mines of "Forty-Nine" that the reckless crimes of the frontier were developed; it was in the saloon and the gambling den next door to the mines—where the men went when the day's work was over. This truth of human

nature was early recognized in the law and order campaign of the Panama Canal.

The day of the Isthmus toiler was filled. The problem remaining was to fill his evening. And in the heart of an untamed jungle, both the possibilities and the encouragements of the subject were limited. On the one hand, Shanton faced the maudlin sway of faro and cheap whiskey. On the other, he confronted the chafing monotony of a border evening, lacking theatres, libraries, and even the gossip of society. It was the choice of a man's sullen thoughts and solitude—or the roulette wheel and forgetfulness. And in the spell of forgetfulness, men even forgot the law and the revelry of the Canal became proverbial.

Then the Young Men's Christian Association came to the Isthmus and the harassed chief of the worn-out police force joined eager hands with the secretary and turned his policing over to the alert man with the bowling alleys and the basket balls and the Indian clubs. Also Uncle Sam turned a kindly eye toward the new arrival—and realizing that a man's working efficiency depends on how he rests and how he plays, gave from his own pocket the funds for the construction of the four Y. M. C. A. club-houses which presently dotted the Canal Zone from Colon to Panama.

Being men who had dealt much with men, the Y. M. C. A. secretaries also shattered the starched traditions of home, and gave the gymnasium over occasionally to dancing clubs, and turned the reception hall over to the pool players, and sold cigars and soda-water at all decent hours, and established a free circulating library with books of real human interest. Moreover they invited in the wives—and defied the saloons to get their men away from them.

And Shanton, seeing how the current of events was wending, leaned back and rubbed well satisfied hands, for in one year the saloons and the crime of the Canal were decreased by thirty-three per cent. When the baseball league was organized the next year, the percentage was pushed to a still higher notch. Now they are doubling the number of the Y. M. C. A. buildings and the gamblers are leaving for Colombia or Jamaica. Shanton's policemen are nearly all Y. M. C. A. men and Shanton himself ranks the power of the organization even above the power of a revolver—which is high place in his esteem.

The problem of the Canal worker's evening has been solved, and the man's physical and moral well-being and the public peace of the community have bounded forward as from a Gatling gun.

The American and Panamanian police do not dovetail. Neither, however, do they conflict. Perhaps this is because a clash would be fatal to the Canal. Yet in no detail are the two extremes of the Isthmian civilization more sharply underscored.

To put it bluntly, the police force of Panama is a relic of the underground dungeons of the Inquisition. The republic of Panama does not permit capital punishment. The statutes of our tea-cup neighbor have eliminated the barbarity of the death penalty with one indignant sweep. But when the judge goes out of one door with the law, the executioner enters by another—without the law.

Suppose we follow the fate of a certain political prisoner, whose crime seems to have been a too great ambition.

Closely surrounded by from six to eight guards—policemen are as plentiful as water in Panama—the prisoner is escorted to the frowning gates of the national penitentiary, overlooking the great blue waves of the Pacific. In due course he is given a cell, but no doubt is too much engrossed in his own reflections to notice the significant shrugs of the shoulders among the attending guards as the door clangs behind him. One man

indeed hastily crosses himself and the majority of the group seem to remember suddenly pressing duties elsewhere. The prisoner has arrived in the late afternoon. If he examines his cell before the swift tropical twilight comes, he finds that the roof is in an extremely indifferent state of repair. In fact, it is sagging at such an angle that even to his careless eye it looks as though it might fall at any moment. The prisoner may rattle the bars of his cage and bring a scowling attendant to the scene.

"Ah, that is all right, Señor!" the guard grins. "Perhaps in the morning we will move you, eh?"

They did—as a corpse. In the night the roof fell, the debris crushing out the life of the helpless prisoner as surely as though he had been swung through the trap of a gallows.

An accident? Such is the official version of the affair and if the one Spanish newspaper makes mention of the incident it is to reduce it to a half-dozen lines.

Ask any of the American veterans of the Isthmus, however, for the truth and he will reply with scraps of the "secret history" of the Panama penitentiary that outrival even the morbid brain of Edgar Allan Poe. The cell with the sagging

roof is so often occupied that its tragedy passes as an incident.

They do not have capital punishment in Panama. It would be embarrassing perhaps to station certain inconvenient prisoners before a public firing squad. The underground cell is more convenient.

They also have jail deliveries at the Panama penitentiary. Often eight and ten prisoners have been known to escape in a group. At once, a pursuing band of soldiers with restless rifles is on their trail. Those soldiers invariably do their work well and promptly. They never bring a prisoner back, and a prisoner never escapes. Always the official report of the affair is the same. The convicts showed resistance and, as was right and proper, they were shot. Panama goes its cynical way undisturbed and the affair is forgotten, for the official memory of unpleasant events in our sister republic is proverbially short.

Return to the veteran engineer, however, who has lived long enough in Panama to see below the surface and he will begin to check on his fingers the list of such "escapes" that he remembers in the past five years. And, as the engineer continues, the number progresses at a rate that is startling. Always there is one central feature in common. The prisoners who escaped were the prisoners

that "the State" wanted to escape, undesirables whose elimination was, er,—advisable!

With a system such as this at his elbow, an unexplored jungle to his right and left, and in its heart the offspring of forty nationalities, the police problem of Shanton is unique in the crime annals of the world.

In his keeping are the safety of his country's gold, his country's subjects, and his country's honor. To their protection he is giving the best that is in him and always with the willingness, when all else fails, to add his life if needs be.

He has made good. What these words mean to the American people, no man can say until the Panama Canal is a reality.[1]

[1] Since this chapter was written Captain George R. Shanton has been promoted to the command of the Porto Rican Police Department, with the rank of colonel. His service at Panama covered a period of four years and six months.

CHAPTER X

THE DISEASE BATTLE OF THE ISTHMUS

FOUR hundred and fifty-two pounds of quinine were consumed by the residents of the Canal Zone during the month of May, 1906. In other words, in the thirty-one days 1,575,000 two-grain capsules were distributed by the American dispensaries. Over 100,000 grains of quinine were needed every twenty-four hours to protect the health of the Isthmus!

To-day, one ninth of this amount is sufficient,—and the death-rate has been cut squarely in two. During 1906, the average percentage of mortality among the white residents of Panama was that of 20 persons to the 1000. In 1909, it will not exceed the ratio of 10 to the 1000.

By these two extremes is the progress of the disease-battle of the jungle to be gauged. Quinine is a big word at Panama—from the moment our steamer docked at Colon we found it emphasized—but it alone has not won the victory.

The sanitary department of the Canal Zone is maintained at an average monthly expense of $100,000. It is costing Uncle Sam $1,200,000 a year to wage the battle with the disease germs of the jungle.

A force of 1500 men is given constant employment—laborious employment often—in the completion of the mass of daily detail work which the campaign embraces. The taming of the Panamanian wilderness has meant its disinfecting as well. It was not enough to exterminate germs of fever and malaria within a man. It was necessary also to exterminate those outside of him before they reached their victim.

A man can endure hardship, privation, hunger, he can win against the odds of Nature, he can defeat the wiles of his fellows,—but the man has not yet lived who can throttle the deadly stupor of a tropical fever. While the canal-builders of Panama have been battling against the obstacles of mountain and jungle, the health-builders have been battling against a more insidious foe,—the circle of diseases bred over night in the devil's own caldron of the wilderness.

Twentieth-century sanitation has scored such a triumph at Panama that for two years not one case of yellow fever has been recorded on the Isth-

mus! Indeed the disease battle so far eclipses any previous feat of this character that it must be awarded a distinctive place in history.

In Colon, the Atlantic port of the Republic of Panama, the number of dead persons is greater than the census of the living. There are more corpses in the cemetery, buried from five to fifty years, than the entire population of the city,—estimated at 14,000.

It is statistics like these that show the full extent of the tropical disease ravages which the American sanitary engineer has faced—and conquered.

The operations of the health experts of the Isthmus include several divergent and yet dovetailing features. The trail of the disease is not always followed to its victims—it is often followed away from them, from effect to cause as it were. In this connection, the features of quarantine and public and private sanitation are of course prominent, but apart from these details the health department frequently sends a detachment of inspectors miles from the beaten track of men,—to localities where perhaps the foot of native or foreigner has not trod for weeks,—there to seek the primary origin of the death-dealing fever or malaria.

It is in this connection that the mosquito appears,—the mosquito which up to the present has claimed more victims each year in the Republic of Panama, alone, than the 6400 death roll of the Spanish-American War!

In the Canal Zone are fifty known varieties of mosquitoes, and at least ten classes which have not been definitely named! The greater portion are harmless, but there are at least three varieties whose bites carry the most dangerous infection,—which in from one to two weeks may easily bring the victim to his death-bed.

In the technical language of the sanitary department, these are distinguished under the heads of "anopheles" and "stegomyia"—the former bearing in their bites the germs of quick-eating malaria, the latter plunging their victims into the throes of yellow fever.

In 1908, thirty-two hundred barrels of oil were used in the mosquito war,—a total of 160,000 gallons. The sanitary department takes the position that every mosquito should be exterminated in the interest of the general health, whether "productive of disease or only profanity," and a wholesale death decree has been issued,—and carried out.

The principal method of execution is the thin,

CATHEDRAL PLAZA, PANAMA

greasy scum of oil spread over the surface of the water, where the breeding-place of the insects has been located. The coating is so light that a small breeze will often sweep it over to the sides of the pool, leaving a comparatively cleared space from which it would seem the mosquito could easily make its escape, without touching its wings to the dangerous fluid. As a matter of fact, however, it is not the amount of oil which the insect receives on its body that renders it harmless. The oil must be absorbed internally and not externally to make it effective.

Contrary to the general belief, a large quantity of water is necessary for the breeding of the average mosquito. A marsh or swamp with comparatively little moisture repels rather than attracts the pest. Tall grass, weeds, or brush rarely serve as a lurking-place for the insect. If there is no body of water in the neighborhood, in ninety-nine cases out of a hundred, there will be no mosquitoes. And in many instances even foul water will be carefully avoided by the female seeking a suitable breeding locality.

Mosquitoes are propagated through the medium of eggs. An expert can tell at a glance the species of insect through the shape of the eggs, the manner

in which they are distributed, and often through the number.

In some instances, hundred of eggs are laid, and then glued firmly together with a thin, paste-like substance so that they can float on the water's surface. In other cases the eggs are deposited singly, while still other species, it is known, surround their eggs with a gelatinous matter after the fashion of a frog.

It is a peculiar fact that the egg is invariably placed in the water point downward, so that the young ones will descend to the bottom and not rise to the top,—where the tropical sun would mean almost instant death.

Under favorable conditions, the eggs may be relied upon to hatch the larvæ in from twelve hours to six days. Translated into plain English, these are the "wigglers," as the layman knows them, which are found in the rain barrel or open cistern.

The larvæ must rise to the surface for fresh air at intervals of not over two minutes. If forced to remain under longer, strangulation will follow. Here is where the deadly work of the sanitary inspector is accomplished, with the oil-can.

During the twelve days which form the usual life of the larvæ, five sixths of the period is devoted to eating and breathing, and the re-

mainder—the last two days—to the purpose of breathing only.

The larva performs the functions of eating and breathing at opposite ends of its tiny, wiggling body. The breathing tube projects from the back, and not the front, its angle depending on the species to which the mosquito belongs. The tube of the anopheles, the malaria-infected mosquito, projects outward at right angles and is so short that the insect is forced to lie in a horizontal position when breathing. At its extremity is a minute valve, which remains shut while the larva is under water, but which flies open at will.

With a twist of its thin, hair-like tail, the insect squirms its way to the surface, thrusts its breathing tube above the water, opens the end valve, and inhales the fresh air around it. When the water is covered with the scum of oil, death and not life is drawn into its body. As the thick, greasy oil is absorbed by the gasping insect, the fluid burns its way through the breathing tube like molten lead.

The breeze invariably clears a portion of the surface, it is true, but as the larva is forced to rise every two minutes both day and night, it brushes against the fiery death 720 times every twenty-four hours!

Cruel, heartless, this method of extermination? It is either the life of the mosquito or the life of the man!

Both with oil and quinine the menace of the mosquito is being fought. Quinine, one of the most beneficial drugs to man that has ever been discovered, is absolutely fatal to the mosquito, and this fact is made known to the tourist even before he sets foot on Panamanian shores. Neatly printed handbills, bearing the signature of Colonel W. C. Gorgas, chief of the sanitary department, are distributed on the steamer deck, and prepare the visitor for the early morning diet of quinine, which he comes to expect with the same regularity as his eggs or breakfast food.

With the subjection of the mosquito, the sanitary department has coupled the extermination of the fly. Although yellow fever has been smothered, typhoid is alarmingly prevalent at the Isthmus, and experts unite in the theory that much of it is spread through the medium of the apparently innocent fly. In no portion of the world to-day is so vigorous a crusade being made against the evil of the house-fly.

The fever is communicated through a needle-like plant, under the scientific name of "typhoid bacillus"—detected only through a microscope—

which clings to the thread-like legs of the swarms of flies, hovering around a garbage or refuse heap. In the path of the insects through the house, and often over the food on the table, the unnoticed bacilli are left behind,—almost invisible particles of deadly poison.

As a first step in the battle with the flies, a complete system of garbage disposal has been organized, supplemented by a thorough inspection of every dwelling on the Isthmus, whether under American jurisdiction or in the limits of the Republic of Panama.

At the present time, 3800 cans of garbage are being removed daily, the refuse dumped into furnaces especially constructed for this purpose,—the system in the heart of the wilderness more perfect than that which prevails in the average American city!

Garbage furnaces are now in operation at the settlements of Gatun, Tabernilla and Empire, and others are being constructed at Culebra and Gorgona, with even more in prospect.

Here is an extract from the September report of the sanitary department for 1907, which shows another vivid result of the house-to-house canvass of the Isthmus:—

Thirty-one houses were condemned as being unfit to occupy in their present state, but which could be made habitable by repairs. The majority of these houses were flat upon the ground and in many cases earth was used for a floor. These dwellings all had condemnation notices placed on them and a reasonable time given in which either to vacate or make the necessary repairs. Only one house was demolished, and this with the consent of the owner.

It may be remarked in passing, however, that, whether the consent of the owner had been given or not, the result would have been the same. By a special concession of the Panamanian government, the American sanitary department is supreme in both the cities of Panama and Colon, although in other respects Federal jurisdiction is not recognized.

The typhoid danger in a polluted water supply has furnished the health department of the Isthmus with one of its greatest problems, which has also resulted in one of its greatest victories. Where as in the past Panama has quenched its thirst from stagnant, scum-covered pools and streams, American ingenuity, under the direction of the sanitary force, has now completed the construction of two giant reservoirs. From the first of these at Rio Grande, the city of Panama consumes

a monthly average of 52,353,000 gallons, and from the second at Mount Hope, Colon and the adjacent territory use an additional 607,298 gallons—water whose purity has passed the most severe chemical test, and whose part in the disease battle of the Isthmus can scarcely be overestimated.

In January, 1907, 1813 cases of malaria from 31,851 men were treated by the two American hospitals of Panama at Ancon and Colon. In January, 1908, 642 cases were registered from 43,851 men; that is, with a force of 12,000 more men, only about one third the number of malaria cases were recorded.

For January, 1907, in every thousand American employes, there was a sick list of twenty-six daily. For January, 1908, the number had decreased to nineteen daily.

Occupying Commission quarters are 6300 American men, women, and children. Among these there was only one death during the month of December, 1908, which would give an annual rate of a little less than two per 1000!

Pneumonia is rated as a leading cold weather illness. Yet, with a temperature of 118 degrees, it causes more deaths than any other disease on the Isthmus. During an average month, it will

produce twenty fatalities, and strangely enough not more than one of these as a rule is recorded among the white population!

The bulk of the mortality is confined to the negroes, and results from their persistent habit of sleeping in their clothes after a perspiring day's work,—at least that portion who do not secure a shelter and meals from the cocoanut tree, spending the night under its branches and shaking their breakfast from its limbs the next morning!

CHAPTER XI

ROOSEVELT AT PANAMA

IT was Shanton who cried, with the soldier's enthusiasm for the leader who has dared and won—and won his heart with the victory—

"This is Roosevelt's Canal. We are digging it for him!"

There you have it,—the real dynamite which is blasting through the jungle and mountain. Not the deadly black powder—one thousand tons of which goes up in smoke at Panama every six months—but the spirit of that man, with the big hand and the big brain and the big personality, twenty-five hundred miles away.

You can't escape it. It dominates the Canal Zone as completely as the contempt for the French or the antipathy to the mosquito.

Mr. Roosevelt has been more than President of the United States—down at Panama. He is the popular idol.

The men at the Canal are scoffing at the puzzled

gropings in the maze of the Roosevelt future. They have definitely settled the problem as to what to do with the President.

Shanton glanced up from the inspection of his rifle with a stare at the probing query I framed.

"Now that Mr. Roosevelt is through with the White House and the Canal,—what?"

"Eh?" He bit the word half through.

I shied a stick at the reconnoitring head of a green lizard in the bushes, as I repeated the question.

Shanton studied the query and the band of his big Stetson hat a full moment before he essayed an answer. He was twirling the hat slowly about his fingers as he fashioned his words, removing his pipe the better to give emphasis:

"I don't see any question there. *Mr. Roosevelt is not going to get through with the Canal!*"

The silence of the jungle fell again and he raised himself to his feet before he continued:

"The President can't leave the Canal now, man! He can't leave us down here, with the work half done. He has given us all our enthusiasm and interest in the job. He kept us at it in the old days when the fever was gnawing us and the newspapers at home were picking us to pieces. And he 's keeping us on the job now, when the

men who have done the things that count are being offered bigger money and the chances of their lives to quit. Some of us have left, but"—Shanton ran the barrel of his Marlin softly through his hands—"more of us have stayed, because it was Roosevelt who was bossing the job!"

Shanton leaned his rifle against a palm tree, slowly doubled his right fist, and brought it down into his left palm with a smack that caused a dozing Indian to roll over into the mud.

"This Canal is the biggest contract of brains and muscle and money that has ever been rammed down the world's throat! Do you mean to say that the President, who has been the man behind it from the first, can leave it before it is finished?"

I slipped a quiet sentence into the argument.

"Do you forget the end of his term?"

Shanton glared.

"Panama needs Roosevelt,—whether he is in the White House or out of it. And Panama is going to have him, —as President if we can, but as boss, whether or no!"

Secretary Joseph Bucklin Bishop of the Canal Commission—and personal representative of the President at Panama—leaned back in his swivel chair in his cool, inviting office at the Hotel Tivoli at Ancon, pressed his hands together, tip to tip,

and scrutinized the ceiling, as he pondered my query as to Roosevelt at the Canal, in the present, —and future.

"It would be no exaggeration to say that the President regards the Panama Canal as the greatest single feature of his administration," said Mr. Bishop as his eyes descended from the ceiling to mine. "Apart from the public interest in the project, I think that Mr. Roosevelt feels the keenest personal interest of his career in its success.

"It is just such a campaign against odds—the odds of nature—that would most appeal to him. It was the battle of the great out-of-doors with which he rubbed elbows when he was down here a year and a half ago, and he sniffed its spirit and plunged into its thick like a veteran war-horse.

"From the steam-shovel gangs upward, it was the men of the strenuous life that he met, who knew him and admired him because of his own strenuous life. We call them 'T. T.'s' down here, 'Tropical Tramps,' because they have dared death from one end of the tropics to the other. Mr. Roosevelt is an ideal after their own hearts,—their tanned cheeks and steel muscles and frank, straight eyes caught him from the start. I don't believe that the Roosevelt smile once left his

THE QUARTERS FOR THE MARRIED AT PARAISO

face from the moment he stepped off the train at Panama until the gang-plank of his steamer was raised at Colon.

"The President sent me on two weeks ahead for photographs to illustrate his special message.

" 'I want pictures of everything and every place I am to see,' he told me, 'pictures that will show something, and mean something.'

"I began my mission with enthusiasm, and in my eagerness scoffed at the Panamanian custom of a two hours' siesta in the heat of the day as a waste of valuable time.

" 'Pack up some sandwiches,' I directed my guide, 'and we need not stop for luncheon.'

"At the end of the second day, I was in a complete collapse. With this experience in mind, I tried to slip a timely caution to the President when he arrived.

"But he laughed away the warning, squared back his shoulders, and worked fifteen hours a day during his visit! Seasoned residents were dazed. Even the hardiest of the old-timers digested his activities as something uncanny. Mr. Roosevelt is the only man I know who has dared and conquered the Panamanian climate!"

Mr. Bishop drew a deep breath and a box

of cigars, with a high-sounding label, toward him. He offered me a selection, with comments.

"The best brand of Havana make,—for this country," he explained, as he tapped one of the fat brown rolls with his forefinger. "Take these to the States and they would lose their flavor at once, even if they did n't lose their cost-tag. Bring American tobacco down here, and the same rule applies vice versa. I once carried a box of cigars from New York as a present to Governor Magoon of Cuba, and invested therein about three times the sum I expend for my tobacco. When the Governor opened the box, and we sat down for a smoke, I was wearing a smile of the pleasantest anticipation. Mr. Magoon lighted his cigar, puffed slowly for a moment or so, and then he turned it around with a puzzled frown, and began again. I followed his example, and was examining my cigar with the same bewilderment, when we both glanced up and our eyes met.

"Say, Bishop," said the Governor delicately, "where did you get these ——things?"

"That was the reception which the finest New York tobacco met—in the tropics. Tobacco, unlike the prophet, is best appreciated at home!"

Under the stimulant of his cigar, Mr. Bishop gracefully tacked back to the point of discussion.

"The President is constantly surprising me by his knowledge of the minor details of the Canal which even the men on the job would have to refer to the file cases to answer. He has at his fingers' tips the scale of wages for every department on the Isthmus, the amount of supplies which the commissary should use in a month or a week, and the effect the weather should have on the record of the average steam-shovel or blasting gang.

"The men down here even say that the President would discharge by cable the person who interfered with the progress of a dirt train!"

Mr. Bishop pushed across to me the copies of two cablegrams which were to form the basis of a story. I give the cablegrams first—

"CULEBRA, Sept. 4, 1907.

"PRESIDENT ROOSEVELT,

"Oyster Bay, New York.

"August excavation from the Canal prism, by steam shovels and dredges, 1,274,404 cubic yards. By steam shovels, 916,950 cubic yards, as follows: Culebra, 786,866 cubic yards; Gatum, 105,223 cubic yards; Mindi, Chagres, La Boca, aggregate, 24,861 cubic yards. By dredging, 357,454 cubic yards, as follows: Colon division, 189,170 cubic yards; La Boca division, 168,284 cubic yards.

"This exceeds all previous United States records.

Highest preceding total for the Canal prism was 1,058,776 cubic yards for July. Rainfall, 11.89 inches.

(Signed) "GOETHALS."

"OYSTER BAY, N. Y., Sept. 5.

"GOETHALS,

"Culebra.

"I heartily congratulate you and all the men on the Canal for extraordinary showing you have made during the month of August. As this is the height of the rainy season, I had not for a moment supposed that you would be able to keep up your already big record of work done, and I am as surprised as I am pleased that you should have surpassed it.

(Signed) "THEODORE ROOSEVELT."

"The President's message was read aloud to a blasting gang at Culebra," supplemented Secretary Bishop, "one of those aggregations of varied nationalities, which include the men of the 'Seven Seas' and the countries beyond.

"There was one man in the number—a mountain of bone and muscle—who received the English language much as sand trickles through a sieve. He asked that the cablegram be reread, listening the while with bent head. Suddenly, he looked up with a great smile flooding his face, as he burst out,—

"'Well, if it's ze cubic that he wants, then we will give him ze cubic!'"

Mr. Bishop drove home his point with the one sentence,

"Such is the spirit of Roosevelt at Panama!"

"And the elimination of the third term?" I ventured. "What will be its effect at the Isthmus?"

"It need not have any!" was the grave reply. "The American people need Roosevelt at the White House; also, they need him at Panama. It is not alone because he is President that he has made a success of the Canal. It is because he is Roosevelt! And he will be the same Roosevelt in public or private life.

"With all of the men who have come and gone at Panama, the President has been always the central figure. He has begun the Canal,—has brought it through the crisis of its early obstacles. Why should he not complete it?"

"As a resident of Panama or Washington?" I queried.

"Either or both," was the prompt rejoinder. "The place of his residence would be a minor feature.

"And,—Panama is no longer the edge of nowhere. It has come to be the centre of a good,

big somewhere. The man who comes down here is not leaving for a camping-out expedition!"

In cold-blooded figures, as separated from the hot-blooded eulogies of admirers, just how is the Roosevelt spirit at Panama to be reckoned? What manner of foundation do statistics build for this cyclone-tribute to the President, which is sweeping the neck of the Continent? *What has Roosevelt done at the Canal? Not what men say he has done.*

For answer, I am going to burrow into the records of the engineer and shake the dust of the file case from the most startling array of figures ever pigeon-holed in the history of the Panama Canal.

Grouped together, they form the magic story of the steam shovel—the giant machine which is crunching through mountains and under boulders, whose iron teeth are tearing and rending and crushing their wizard-path from ocean to ocean—the machine which is nothing but a great, ungainly, useless mass of rusty metal without the spirit of the pigmy Man behind it.

It is the steam shovel which has made the Panama Canal possible; it is the men of the

steam shovel who are giving mechanical experts to-day the greatest puzzle of the Isthmus.

In 1906, the maximum capacity of the steam shovel—and this reached apparently by the most vigorous efforts possible—was measured at 363 cubic yards per working day. In 1909, the same shovel and the same workmen, confronted by the same conditions, are increasing this record to 1000 cubic yards. How?

Two years ago the maximum canal excavation for the month was placed at 1,000,000 cubic yards. To-day, this output has been trebled, so that a record of 3,000,000 cubic yards has been reached on two occasions during the summer of 1908. What is the secret of this amazing stride?

The steam shovel does not have more or better improvements, the obstacles to be confronted are just as numerous and just as stubborn, the ground is just as unyielding and just as rocky. What then is the reason?

Experts, failing to find explanation in the machinery or the soil, have fallen back by process of elimination to the workmen. And at once light floods the problem and throws into a clear-cut relief a fourth feature.

Against the wall of the Panama jungle, the

investigator sees the bold, forceful name of Roosevelt. The men on the Isthmus to accomplish a record, that has brought the engineering world into the sharpest attention, have been animated by what,—whom?

The student's eye and pencil pause at those Canal statistics which were returned in the latter part of 1906. Opposite them in Panamanian history is the visit to the Isthmus with which President Roosevelt electrified the American people. From that date, the astonishing increase in the Canal excavation began to assert itself. Records which had been deemed of top-notch rank previous to the President's visit were smashed like egg-shells a few months afterward!

A man had come to Panama, and mingled among the men of the Isthmus for a span of hours, and it was as though a monster electric battery had galvanized the life of the jungle.

Call it what you will, define it as you will, this is the Roosevelt spirit at the Canal,—mystifying, magnifying.

The sledge-hammer testimony of these sharp-spiked figures of Panama, which proves even while it does not explain the point, I submit to you verbatim:

THE STORY OF THE STEAM SHOVEL

CENTRAL DIVISION

CULEBRA CUT

Period	Average number of steam shovels at work.	Number of working days in month.	Output per shovel per day, cubic yards.	Output per shovel per month, cubic yards.	Rainfall, in inches.	Maximum temperature in sun at Empire. (Degrees Fahr.)
1906						
January	12.83	26	363	9.430	1.19	
February	12.48	23	587	13.494	0.64	
March	12.37	27	716	19.355	1.34	
April	12.33	24	720	17.289	8.43	
May	12.41	27	581	15.684	7.25	
June	14.81	26	539	14.026	8.94	123
July	16.64	25	378	9.441	20.26	127
August	16.93	27	536	14.461	12.97	132
September	21.33	24	568	13.664	6.62	130
October	22.67	27	532	14.373	8.46	128
November	20.46	24	459	10.833	19.19	120
December	22.68	25	491	12.267	9.09	108
1907						
January	31.04	26	702	18.248	0.00	104
February	39.87	23	674	15.966	0.49	108
March	43.88	25	741	18.530	0.08	105
April	44.12	26	765	19.884	0.04	110
May	31.70	26	833	21.674	7.45	118
June	38.28	25	651	16.266	14.74	118
July	43.38	26	680	17.670	9.42	118
August	39.70	27	729	19.680	11.81	120
September	38.50	24	811	19.468	11.38	123
October	37.63	27	813	21.963	15.27	123
November	41.88	24	784	18.818	6.91	123
December	42.72	25	965	24.113	2.30	124
1908						
January	43.42	26	1.084	28.177	0.91	125
February	43.67	24	1.186	28.475	0.01	124
March	42.19	26	1.171	30.451	0.13	125
April	41.28	25	1.202	30.031	1.67	127
May	41.56	25	918	22.948	12.63	129
June	42.92	26	1.011	26.281	8.76	126
July	52.57	26	1.071	27.848	13.23	121
August	52.58	26	1.122	29.184	7.74	

TOTAL EXCAVATION, CENTRAL DIVISION (CULEBRA CUT)

Months	1904	1905	1906	1907	1908
January		70,650	120,990	566,750	1,227,022
February		75,200	168,410	639,112	1,248,265
March		132,840	239,178	815,270	1,290,885
April		127,749	213,177	179,527	1,242,574
May	27,556	75,935	196,209	690,365	960,840
June	32,551	76,905	212,623	624,586	1,134,032
July	31,599	78,570	159,789	770,570	1,121,325
August	35,056	49,210	244,823	786,866	1,171,927
September	25,220	44,085	291,452	753,468	
October	19,695	52,940	327,009	834,499	
November	28,860	60,540	221,642	790,632	
December	42,935	70,630	307,689	1,025,485	
Totals	243,472	914,254	2,702,991	9,177,130	9,396,870

Total to September 1, 1908—22,434,717 cubic yards.

FRENCH AND AMERICAN RECORDS

Highest elevation on new centre line of Canal before excavation began by the French:

At Culebra	312 feet.
At Bas Obispo	233 "

Greatest depth of excavation by the French:

On I. C. C. axis—At Culebra	161 "
At Bas Obispo	148 "

Greatest centre-line depth remaining to be excavated when Americans took control in order to reach the bottom of an 85-foot level canal:

At Culebra—at same point as before	111 "
At barrier on Contractor's Hill, about	140 "
At Bas Obispo	45 "

	Cubic Yds.
Total excavation by the French at all points and including diversion channel, about	81,548,000

Amount excavated under American control to September 1, 1908:

In Culebra Cut	22,548,000
By steam shovels	29,872,308
By dredges	17,475,123

Total by steam shovels and dredges, entire Canal—47,347,431

Peters, the chauffeur, halted Colonel Goethals's railroad motor car in the swirling smoke clouds of the Culebra Cut, and I clambered into the dirt train, under a vomiting steam shovel.

The shirtless man, guiding the dipper, nodded across at me, and a moment later, as a lull came in the plunges of the great iron scoop, found voice to speak.

The President's visit opened the chat like a grain of corn popping.

"Over there," said my friend of the steam shovel, pointing indefinitely across toward Gold Hill, "a section gang had been getting ready for days to welcome Mr. Roosevelt. Not one of the men could speak English, but they had persuaded some one to paint a rough canvas sign for them.

"When the President's special car steamed through the Cut, the sign was suspended squarely before his eyes, with the inscription,

"*We will help you!*"

"It was a rude sprawling sentence, done by a rough charcoal artist on a dirty, greasy background, but I believe that the President shook hands with every man in that gang!"

Shanton tells me that Mr. Roosevelt has one engagement ahead of him down at Panama, which

he is bound to fill. His eyes twinkle as he describes it in this wise:

"The President has hunted from one end of the country to the other, but he has never yet gone after a Panama 'gator. And we whetted his appetite for the sport during his visit, until he insisted on our taking him for a half-day's shooting down the Pacific Coast.

"He even planned to go on board the government scow the night before and sleep, so that we could get an early start, but at the last moment his work accumulated, so that we had to give up the excursion. The President was the most disappointed man of the party.

"Never mind, I'm coming back after those 'gators, Shanton!' he said as he left.

"And he will, too!" Shanton finished, confidently.

CHAPTER XII

THE WOMEN OF PANAMA

THERE was loudly expressed sympathy for Mrs. Smith all along the block when the awestruck neighbors learned that she was going to Panama. She was such a shy little creature, you know, hardly reaching to her husband's shoulder, and married only ten months! The idea of whisking her off to a jungle where snakes crawled into your bed, and alligators lurked around your back door, and you had to eat canned food or cocoanuts!

"They tell me that the snakes in Panama are twenty feet long," interposed Mrs. White with proper dramatic force.

"And they do say that the poor men who are digging the Canal have to sleep in the mud," chimed in Mrs. Stevens's shrill falsetto.

"They may think themselves lucky at that," contributed Mrs. Black gloomily. "My husband

says that mosquitoes eat people alive down there!"

"Are you talking about the Smiths?" put in a new arrival. "Isn't it terrible about their going to Africa?"

"You mean Panama, don't you?" corrected Mrs. White.

The other shrugged her shoulders. "Oh, it's all the same. Anyway I guess Panama is the worst of the two!"

One may hear dozens of such expressions. The American people are digging the greatest waterway in history at Panama, and yet to our average citizen Panama seems as vague and as far away as Timbuctoo. His impression of the Isthmus is that of a vast swamp of black mud or a thick jungle of poisonous foliage—with the civilization of the swamp or the jungle. He views the men departing for the Panama Canal as our grandfathers viewed the California gold-seekers leaving for the long trip across the western plains.

Against this background he is apt to be dazed by the statements that the women of Panama have secured grand opera and have organized a chain of flourishing literary clubs and maintain a social life almost as modern and complete as

that of his own city. The woman who accompanies her husband to the Canal may view the prospect ahead as a long stretch of frontier hardship and sacrifice, and she may leave her new gowns and bonnets at home. The next letter to "the States" however will contain an urgent request that the aforesaid gowns and bonnets be shipped without delay. She has found that the women of Panama follow the prevailing styles almost as closely and have almost as many opportunities of exhibiting them as the women at home.

True, within half a mile or less of their back doors is a jungle which has defied civilization for nearly four centuries. True, they must take quinine with their breakfast food to escape the fever mists and must wage a constant war with the little tropical ants to save their parlor furniture. Also they see monkeys and parrots and lizards much oftener than horses and mules, and must substitute cocoanuts for apples and palm trees for maples, and must accustom themselves to an average temperature of something over one hundred degrees. These are the facts of Nature. But the women of Panama have risen above them.

They have faced the jungle unflinchingly and

in its isolation have seen both their greatest hardship and their greatest opportunity. They have combated the wilderness with the social, literary, and musical activities which it would seem to deny them the most rigorously.

A modern woman's club in the jungle may appear impossible. The women of Panama have shown that not only is one club possible but more than a dozen. Grand Opera may appear as far removed from the wilderness as Caruso is from the Hottentot but with other co-operation the women of Panama have secured it.

Mrs. Graham's card party or Mrs. Jones's musicale or Mrs. Smith's reception are society items which may seem as incongruous in the Panama jungle as an alligator on Broadway, but the visitor to the Isthmus will assure you that they are almost as significant a part of life in the Canal Zone as the new records of the steam shovels in the Culebra Cut.

The beautiful Government hotel, "the Tivoli," is large enough and modern enough to permit of the most elaborate receptions. Built on the elevation of Ancon overlooking the city of Panama and the Pacific, its site is one of the most ideal on the Isthmus and the architects in charge of both the exterior and interior plans have endeavored to pro-

duce a building worthy of the natural advantages. At a casual glance, the Tivoli might be a popular hostelry located at any typical Altantic watering place. From the lobby particularly there is nothing to suggest either the Panama jungle or the Panama Canal. During my visit, there were private dinner parties every night and some of them of quite a formal character. Indeed the dining-room showed almost as many men in conventional evening clothes as one would find at any representative hotel of "the States." A majority of the officials of the Canal have endorsed the Panamanian custom of white duck instead of formal black for after-dinner functions but against the background of glistening silver and gleaming lights this innovation increases rather than decreases the social atmosphere.

For the more elaborate receptions at the Tivoli a special train is often scheduled from Panama to Culebra in the early morning, dropping the guests at the various points along the line. The only feature that brings home the proximity of the wilderness is the fact that many persons in order to reach the city of Panama for evening entertainments are obliged to make the trip in the baggage car of a freight train, finding seats on upturned barrels and boxes.

Such a journey in evening dress is not the most alluring prospect—particularly after the veteran railroader enlightens you as to the character of the Panama freight train—but the reception committee does put forth an honest effort to give you sufficient enjoyment at the end to atone for your bruised pride and perhaps your bruised body. If riding to a ball in a box car is descending to the primitive, the ball itself ascends to the heights of fashionable society. Panama, that is American Panama, will surprise the visitor quite as thoroughly at the Tivoli ballroom as at the Culebra Cut.

It is true that the social activities of the Tivoli from the standpoint of dollars and cents are beyond most of the women of Panama. As a matter of fact a comparatively small per cent. can afford the financial outlay which they demand. Admitting that Panama society is democratic—the officers of the leading club ranging from Colonel Goethals to a department clerk—the majority of the families of the Canal must confine their amusement to less expensive channels.

To find the real social side of the Isthmus, therefore, we must leave the rotunda of the Tivoli and journey out to the straggling settlements

dotting the line of the Panama Railroad. And we must choose one of the afternoons when most of the women's clubs are in session.

Perhaps our route has taken us to Gorgona, and our visit has fallen on the day when the Woman's Club is deep in a discussion of the approaching Christmas festivities. The Y.M.C.A., the Sunday-school and the public school of the village have been invited to co-operate with the club in the preparation of a record-breaking programme. They have all accepted the suggestion and we find the women entering into the project with a heartiness and enthusiasm which laughs at the obstacles of frontier civilization. The club is determined that this Christmas in the jungle shall be a memorable one. Home may be two thousand miles away but the women can create home cheer and home conforts in spite of this fact. Listen to the programme they are planning.

Of course the children of the village must have a genuine Christmas entertainment such as they have always known at home, with a Santa Claus and sleigh-bells—even if the thermometer is registering more than a hundred degrees! And there must be candies and oranges and toys in Santa's pack if the Government steamer has to make a special trip to New York

for this purpose. And there must be a real Christmas tree, to be sure! The best plan will be to hold an old-fashioned Christmas Eve celebration in the Y.M.C.A. building. Then there will be room enough and welcome enough for everybody.

Can you wonder that the men of the steam shovels and "dirt trains" are smashing world records down at Panama, with women like these to inspire them?

There is no Christmas in city or jungle that is complete without the charitable feature. At home we give our surplus money and clothes to the ragged newsboys. But, you say, there are no newsboys in Panama? Oh yes, there are, and just as ragged and just as needy as those of New York. In the city of Panama, there are two daily papers besides those of Colon, and if they are delivered by little, dark-skinned urchins who combine the blood of half a dozen nations in their veins and sleep under a palm tree instead of in a frozen ash-barrel, the same field for charity exists—broader perhaps because it has been so long neglected.

The Woman's Club of Gorgona has these details in mind when the report of its philanthropical committee is called for, and the chair-

man announces that the members are sewing hard on a variety of garments to be distributed to the newsboys on Christmas day.

Now we come to a phase of charity in Panama peculiarly unique. Some one has reminded the Woman's Club of the leper colony at Palo Seco. Barred from friends, home, family, the unfortunate inmates must watch the approach of the great holiday with bitter emotions. They are cast off from the world and its joys and pleasures. Who more in need of Christmas gifts and Christmas sympathy? So an item is made of the Palo Seco lepers in the list of holiday preparations and the Gorgona women turn to other angles of their discussion.

Before we leave we learn that their organization includes a literary department which is pursuing an excellent course of study in Spanish; a musical department which is planning a programme of classical selections in the near future; and an historical department which is outlining a series of papers by its members on the early romance of the Isthmus.

All of these features, mind you, in the heart of an unexplored jungle! This is how the women of Panama are spending the long days when their husbands are toiling under the copper

rays of the sun and bringing the great Canal nearer and nearer completion.

If we are disposed to tarry at Gorgona we might make the acquaintance of the Chorus Club or the Girls' Bowling Club or the Dramatic Club, which renders four or five really excellent programmes in the course of a year. But we recall that this is only one point in our itinerary and hasten onward.

We chance to reach Ancon on one of those two days when the Woman's Club is holding its Christmas bazaar and find ourselves in a prettily decorated Japanese tea-room, with a confectionery counter adjoining and still beyond a cleverly arranged apartment where are exhibited children's gifts of all descriptions. We are rubbing our eyes when we reach the street and remember that we are in Panama.

We might increase our visits to Gatun, Paraiso, Empire, Cristobal, La Cascadas, Pedro Miguel, Culebra, and other of the Canal settlements and in all of them find the women organized quite as effectively and enthusiastically as at the points we have mentioned, for the Panama branch of the American Federation of Women's Clubs is nothing if not thorough and it might almost be said that it has established itself wherever

the zigzagging line of the railroad is dotted by a handful of houses.

To the personal efforts of Miss Gertrude Weeks and Miss Helen Boswell, working under the auspices of the American Government, much of this success is due. It required not only a tremendous amount of preliminary labor by pioneers such as these for the establishment of a chain of women's clubs in a tropical jungle, but it has needed hard and constant effort to keep the chain up to a standard of real efficiency. What the Y. M. C. A. has done for the men of Panama the Federation of Women's Clubs has done for the women of Panama.

The success of the Canal-builders of the Isthmus has ever depended upon the success of the Civilization-builders. The French stumbled past this fact completely and devoted their energies entirely to the mechanical side of the undertaking, forgetting that beneath it there was a human side. Whether they could have dug the Canal under any conditions is a question, but it is certain that the task would have been impossible on their principle of viewing men like machinery. The United States saw their error and escaped it at the cost of being denounced for gingerbread trimmings and a useless waste of public money.

The cynic laughs at the women's clubs and the Y. M. C. A. buildings, forgetting that three fourths of the Isthmus is a jungle and that when the forty thousand men in its heart have completed the day's work they have still four or five or six hours they must pass—how? And with the women these hours are multiplied two and three times until they stretch out to a long day there in the wilderness with home thousands of miles away and the dangers of the jungle always at their elbows.

The women's clubs may be denounced as a "fad" but through them the Government has found one of its most powerful channels of reaching and inspiring the toiling men of the Canal. The cheery wife at the front door braces the weary man for his next day's work as all of the gold of the nation could not do—and in her turn she has been strengthened for her battle with hardship and solitude and discouragement, and thus enabled to renew the drooping spirits of the family circle, by two paramount factors.

One is her own optimistic, inspiring, unselfish American womanhood. The second is the organized club and social life which allows her to forget the wilderness at her back door.

CHAPTER XIII

LIEUTENANT ISAAC C. STRAIN—HERO

HERE is the story of the man who dared and won at Panama in the days before Colon had outgrown the mud-village period, when the Isthmus was called "Darien," and hostile Indians lurked behind the palm trees with drawn bows and little poisonous arrows. In all of the grim history of the Panama jungle there can be found no more thrilling example of man's bravery than the story of the American naval expedition that made the first survey from Caledonia Bay to Darien harbor under the leadership of Lieutenant Isaac C. Strain. And in all of the annals of the American navy, whether of peace or war, no more lion-hearted character stands forth than that of Lieutenant Strain. To the world—even to present-day Panama—Strain may be an "unknown celebrity," but in the roll of the world's heroes who have confronted their duty unflinchingly in the face of hardship, privation, death, no name is more vividly underscored.

The history of the Strain expedition is as dramatic as a romance. With the touch of J. Fenimore Cooper it would take rank as one of the most absorbing tales of wilderness-adventure ever written. But the world would regard it as fiction and digest it as such.

It was in the winter of 1854 that the *Cyane* dropped anchor in Caledonia Bay and Lieutenant Strain and his party of twenty-seven men saw the frowning shores and vast green stretches of foliage behind which—how many miles they did not know—lay the harbor of Darien.

Although the discovery of the Pacific had taken place nearly four hundred years previous, an accurate survey had never been made of the winding land belt which separated it from the Atlantic. The Isthmus of Panama was as unknown to the white man as Central Africa. In 1849 an Irish adventurer had announced to the world that he had traversed the Isthmus repeatedly and that only "three or four miles of deep cuttings were necessary to make a practicable ship canal from the Atlantic to the Pacific." Indeed, a book was written on the subject and something of a world sensation resulted. A company of English capitalists, aroused to action, even dispatched to the jungles of Darien a civil engineer by the name of

Grisborne, with instructions to verify the report. Just how far he penetrated inland will never be known but a few months later he returned to Europe with the written statement that "it was barely thirty miles between tides" and that the "summit level of the Isthmus was only 150 feet."

Inflamed by the announcement, France, England, New Grenada, and the United States promptly organized a series of expeditions for a thorough survey of the territory. Of the exploring parties, however, only one achieved its mission. This was the band of pioneers who flew the American flag. Their itinerary began at a point on the shores of Caledonia Bay and ended at the Gulf of Darien—a path which had not been traversed by the foot of a white man since the year 1788.

There were those in plenty who had attempted it, for even then the tales of jungle-treasure had thrown a magic allurement over the Panama wilderness, but none of the gold-seekers had lived to tell the tale. Whether they had met death from the arrows of hostile Indians, whether the poisonous fever of the Isthmus had crept into their veins, or whether they had fallen victims to the prowling beasts of the forest, the coast settle-

ments never knew. The veterans of the tropics shrugged cynical shoulders—and gave the Panama jungle a wide berth.

This was the wilderness into which Strain and his gallant party plunged on the morning of January twentieth. The band was equipped with provisions, calculated to last for ten days, if used with caution. It was to be in every respect an expedition of peace so far as was practicable. Each man was equipped with but forty rounds of cartridges.

From the outset Strain insisted on assuming the heaviest burdens of the party and was noticeable by a heavy field-glass swung over his shoulders. Similar expeditions at the four points of the compass had made the Lieutenant not only a daring but an experienced woodsman. Under his outer shirt he wore a second shirt of linen—with a shrewd remembrance of the invaluable qualities of the material as bandages in bullet wounds. But the secret of the linen shirt he kept to himself until it was called into use.

The earlier route of the party followed closely the winding banks of the Caledonia River. Almost from the beginning, frequent indications of lurking Indians were found. During the second day's march, abandoned native huts and dugouts

were discovered, with every indication that their owners had deserted them at a moment's notice. To a man of Strain's experience these facts pointed unerringly to the uncomfortable conclusion that the Indians meant to fight—and fight promptly.

When the reader—snugly established in his armchair, I hope—recalls that even to-day two thirds of the Panama wilderness has never been explored, he can appreciate the gravity of Strain's position. But the Lieutenant was not a man to be daunted. If he examined his rifle more closely, he pressed onward all the more resolutely.

To make matters worse, the disagreeable conviction was pressing itself upon him that the river route he had mapped out was impracticable. Before the party towered the dark, rocky Cordilleras. The Americans had conjectured that the Caledonia had ploughed a channel through the mountains and, if they followed it far enough, they would find a trail blasted by Nature. But even to inexperienced eyes it was becoming plain that, if this were true, the route was barred to men.

It was a grave step to plunge from the banks of the river into the heart of a trackless wilderness. But when Strain gave the order which changed the course of the party, there was not a murmur. Indeed the men essayed a cheer. They were

soldiers and sailors of fortune, who had looked upon the bright face of danger so long that it had blinded them. They were used to the hazards of the enemy's country and before the first day of their new route had drawn to a sullen close they realized that they had invaded it.

On every side were evidences of hostile Indians. The more advanced of the party even fancied that they could see dark, stealthy forms in the brush, and weapons, which until now had been swung carelessly over their shoulders, were abruptly transferred to alert, nervous hands. The evening camp was pitched in a circle of restless sentinels. The night was broken with a succession of muffled alarms and twice the party sprang from their blankets to repel a fancied attack. Morning broke over a group of haggard faces. The menace of the invisible enemy was wearing even on nerves that had survived a score of open battles.

If the Indians intended to attack, why the delay? The strength of the Americans surely was apparent to the roving eyes behind the dark fringe of trees. It was this last thought which brought the cold sweat to Strain's brow. Was it possible that the savages had cut off their retreat and were suspending hostilities because their ad-

A PANAMANIAN "WASH LADY"

vance was bringing them nearer to the Indian villages and so to the heart of the trap they had blindly entered?

For another day and night the situation continued without a change. Strain realized that their only hope was in a straight path ahead in spite of its dubious ending. To change their course or to attempt a retreat would be to invite instant destruction.

It was early in the following morning that the party confronted the apparent crisis of the situation. Directly in the path ahead the Americans saw a group of five Indians advancing toward them at a rapid trot. They were armed to the teeth, and Strain's first impulse was to give a quick order to fire. If he had done so, it is probable that not one of the expedition would have seen another sun set.

As it developed later, the white men had been between two hostile war parties for twelve hours and the fact, instead of proving a double peril, was really their salvation. The Indians represented two tribes between whom the hatchet had not been buried for a generation. The presence of the Americans had kept them from flying at each others' throats, and the spectre of the feud had saved the Americans in their turn from a

shower of arrows. The last day's march had taken the expedition out of the territory of the first tribe. The natives now advancing toward them hailed from the coast and were shrewd enough to see that their profit lay not in attack but in friendship. Undoubtedly the white men would be willing to pay a high price for guides. Probably their friends also would be grateful and generous. Why not earn their rewards instead of courting their vengeance?

It was a heartfelt sigh of relief that Strain breathed when he learned the Indians' mission and acceded to their terms. His high hopes, however, were doomed to a bitter collapse. For two days their progress showed no discouraging feature. On the second evening their guides met another party from their tribe and a spirited conference followed in their native tongue. The Americans never learned its exact details but, at its conclusion, the attitude of the Indians changed completely. Beginning with the third morning the native guides maintained a pace so sharp that it was only with the utmost effort that the white men could keep them in view. Several of the party already were beginning to yield to exposure and fatigue, and when the evening halt at last was reached they were exhausted com-

pletely. To add to the sombre outlook only one day's provisions remained, and the Indians refused point-blank to replenish the larder. The secret of the natives' changed attitude has never been explained. Whether the newcomers had persuaded the guides to abandon the white men and later return to their attack or whether the Indians threw up their task in disgust under the jibes of their companions will always be something of a mystery. For another day the natives held their posts, maintaining the same man-killing pace. So difficult was the path that although both red and white men put forth their hardest efforts, a distance of only twelve miles was covered in as many hours. Early the next morning the guides disappeared entirely. The party was deserted in the heart of an unknown wilderness with no food, shelter, or map, and with more than half of their number alarmingly ill.

Strain ordered a halt and called a council. The group of ragged men realized that they had to prepare for a hand-to-hand grapple with death. A short distance to the rear they had crossed a stream which Strain believed to be the Iglesias. Forty miles ahead—or more—lay the Savana. If they could reach the latter stream, they would find white settlements and friends, but the inter-

vening route extended through one of the most tortuous mangrove swamps in the world. They could depend on neither water nor game at any point of the journey, and without both the goal was clearly beyond their physical powers of endurance. Only one course remained. This was to follow the Iglesias until it emptied into Darien harbor. As Strain cast his eyes over the exhausted group, he realized that many could never reach the journey's end alive. But even his gloomy forebodings did not picture the ravages which privation was to make in the ranks before him.

As it developed, it was not the Iglesias but the Sucubti River which the party had struck, one of the most important streams in Central America, although hitherto it had not been indicated in any map of the Isthmus. For eight days the expedition forced its way through the jungle, subsisting on nuts and the occasional birds which the more expert marksmen were able to wing. Their clothing hung in tatters and their bodies were a mass of swollen sores. Their peculiar nut diet had brought on severe internal cramps and loosened their teeth. On the third day they sought to make a short detour at a bend of the river and lost the stream altogether. For two

days they hacked their way through the underbrush before they reached water again. This time it was the Chuqunaqua River which they found, perhaps the most treacherous and tortuous stream from Nicaragua to Colombia. Its steep, winding banks greatly increased the difficulties of their progress. Once Strain endeavored to build a raft in the hope of its carrying the weaker members of the expedition to the coast. When the project was finally accomplished, the current wrecked the flimsy structure within an hour of its launching. The plan which had been vaguely forming in Strain's mind for some days now took definite form.

It was hopeless to expect to reach a settlement at the pace they were making. At most the party could not accomplish more than five and six miles in a day's journey. Was it possible for two or three of the stronger men to push on ahead and send back a relief expedition? Strain did not make the plan public until he was convinced that it was their only hope, and then he put it in the form of a suggestion, offering himself to share the danger and responsibility of the advance party. Several of the men at once stepped forward as volunteers, and from the number he selected three who had shown the greatest strength and endur-

ance. He did not try to soften the perils before them. By this time every member of the expedition knew that the issue of life or death was only a question of days. If Strain could reach the coast there was a chance of rescue. But no one knew the odds against him better than the men he was seeking to save.

Strain placed Truxton in command during his absence, paused for a few moments' final leave-taking, and then plunged resolutely into the dark fringe of underbrush before them. This was on the thirteenth of February. Thirty-nine days were to pass before he saw the party again.

The privations which followed are almost beyond belief. Here are random extracts from the official diary of Truxton's command:

"March 2.—Several of the men found under their skin to-day a singular species of worm called by the natives 'Gusano del Monte' (worm of the woods). It was covered over like a blind boil and grew rapidly, attaining a length of one inch. When it was in motion it was extremely painful. The party subsequently suffered very greatly from these pests, and in many cases were obliged to have them removed by a surgeon after the journey had terminated.

"March 3.—Early this morning Lombard, Parks, and Johnson left the camp without permission, and

when it was found that they had taken their blankets and cooking utensils, it was supposed they intended to desert and try to regain the ship by making their way back up the river. After an absence of two or three hours, however, they became frightened and began firing signals of distress. Truxton, however, for a long time left them to wander about. At last he ordered their signals to be returned, and they came into camp alarmed beyond measure and most penitent. They confessed that they intended to hide away until Holmes (who was dying) was buried and then dig up the corpse and fill their haversacks with the flesh.

"Sunday, March 5.—We have now been waiting twenty-one days for Lieutenant Strain's return and the conclusion forces itself upon us that, if he with three strong men could not reach the settlements in this time, our suffering, debilitated party of sixteen could never get through. A council of the officers, therefore, has been held and we have determined to make our way back up the river and seek to regain the ship. To push on is madness. Whether Strain has perished from hunger, has been devoured by wild beasts, or slain by Indians can only be conjectured."

The following two weeks were a veritable Inferno. Holmes was given a rude burial, followed in a short time by that of Castilla and two days later by the death of Polanco. The latter

occurred among heart-rending circumstances. When his illness reached the point where he could no longer continue the journey, a council of war was held and the question was argued whether the life of one man who could not survive more than a few hours should be placed before the lives of his fourteen companions. Under the conditions it was deemed necessary to leave Polanco to his fate. Three times Truxton went back to bid him farewell and at last with streaming eyes gave the order to advance. How long Polanco lay in the rough clearing was never known, but it was afterward found that he had succeeded in crawling back to the grave of Castilla where death finally overtook him.

Lombard, the boatswain, was the next man to go. When it became evident that he could advance no farther, he asked that a fire be kindled and a knife and hatchet given him. They left him sitting back against a tree with the river whirling at his feet. How or when he met death was never ascertained.

Here is a vivid account of the last days of the expedition, in those hours when the death of all seemed certain. The extract is taken from an article by J. T. Headley, published in *Harper's Magazine* shortly after the events described.

"It was not death they feared: it was the desolate fate of being left alone in the woods that made them try to march. Again and again a poor wretch would sit down declaring he could go no farther; but as the forms of his comrades vanished in the forest, he would struggle up and stagger after them. The weaker they grew, of course, the less able they were to get food and thus hunger and weakness acted on each other.

"Some of them even wished they might get an Indian to eat; and though the horrible thought may have occurred to some of devouring each other, it found no outward expression; nor could it, for, still true to their high obligations, the officers retained their lofty character and through it their supreme authority.

"Nothing more vividly illustrates the terrible straits to which they were reduced than the following incident. Truxton, one day in casting his eyes on the ground, saw a toad. Instantly snatching it up, he bit off the head and spitting it away, devoured the body. Maury looked at him a moment and then picked up the rejected head, saying, 'Well, Truxton, you are getting quite particular. Something of an epicure, eh?' With these words he quietly devoured the head himself.

"After his return, a friend in questioning him about the incident said, 'Why, Maury, I thought the head of a toad was poisonous.' 'Oh,' he replied,

'that is a popular fallacy, but it is devilish bitter!'

"To a mere looker-on the camp on that last night would have presented a most heart-rending spectacle. It was plain that only two or three could reach the banana plantations toward which they were struggling, while four or five must be left alone in the jungle to starve or to die. Three knew that their fate was sealed and looked forward to their abandonment with a calm, stern eye. Their young commander, Truxton, would in all human probability never lead them again. Weighed down with the terrible responsibility of so many lives resting on his exertions, he had borne nobly up until the sudden attack caused by eating some unknown berries. As he lay with his head resting against the root of a tree, his clothes in rags, his face wan, his dark eyes sunken, while the blood streamed from his hands which the thorns had pierced—he presented a spectacle that would draw tears from stones. Boggs, a young man of fortune, who had joined the expedition as an amateur, lay near him. It was plain that he had made his last march. He was engaged to a girl in Illinois and visions of her kept hovering before him.

"A few steps off in the men's camp, the spectacle was still more harrowing. Some were sitting on the ground with their heads doubled to their knees so that the pressure would relieve the gnawing pain in their stomachs, while others were lying flat on their backs staring up at the sky. Harwood, a young man,

twenty-two years of age, was doubled up, a mere bundle of rags, his neglected hair streaming over his shoulders, giving him a weird, unearthly appearance. He knew that his marching was over. Beside him in the same position and almost naked, sat another young man, Miller, who was also to be left in the morning. A short distance from these sat Harrison leaning against a tree. He was a tall, powerful man, but now wasted to a skeleton and only half covered by his rags. He had been one of the best men in the party, but starvation had done its work and he had taken his last step toward the banana plantations. A little farther off lay Vermilyea, with his skeleton arms flung out upon the ground, from which he could not rise even to a sitting position. A settled gloom, a chill despair, an appalling resignation characterized each man.

"Just as night was descending over the forest, a report like that of a musket was heard down the river. Maury, who was sitting near the shore, shouted, 'Truxton, I hear a gun. Shall I fire?' 'Yes,' replied Truxton without stirring. 'But I am not loaded with slugs.' 'Never mind,' was the weak response. 'Fire away.' In a few moments Maury exclaimed again, 'I see boats and Indians.'

"Then again, 'I see boats and white men,' and still again, 'I see boats and Strain!' The expedition had been saved at that moment when the fate of all had seemed to be sealed."

Strain's battle with the wilderness in search of a relief expedition represents an achievement almost more than human. It was only his indomitable will which kept the little party alive. The latter part of the journey was made on a raft. The structure was wrecked on a mass of driftwood near the river's mouth and the intrepid Americans finished their trip on a log. When the coast settlement of Yavisa was reached, Strain was so exhausted that he had to be carried from the river.

Of the twenty-seven men who composed the party, one third died from exposure and privation. Of the remainder fully half carried the effects of the terrible ordeal to the grave. Lieutenant Strain, in his report to the Secretary of the Navy, says that the expedition was "without brilliancy, because without success." From an official standpoint the report was true. The survey of the Isthmus, which it had been hoped to accomplish, was impossible. But a greater evidence of unselfish heroism in the face of peril and privation has never been recorded in the annals of American history. The expedition effectively exposed the false reports which had been given to the world regarding Panama and showed for the first time the true character and extent of the

wilderness which covers the neck of the American continent. If a more positive result were not achieved, the failure was not due in any sense to the men who helped blaze the way for the greater triumphs of the twentieth century.

CHAPTER XIV

THE TRUTH ABOUT THE GATUN DAM

THE smile of William Howard Taft, forty-seventh President of the United States, is of large proportions. Also it is thoroughly hearty and genuine, expansive but never thin. It was in vivid evidence at the Culebra Y. M. C. A. building during his Isthmian visit of February, 1909, when the President in his address to the men of the Panama Canal reached the subject of the much-assailed Gatun Dam. Behind the smile there was a story, one of the few that President Taft tells in public, and behind the story there was a characteristic summing up of the truth about the Panama Canal:

"In my early days at Cincinnati there used to be a judge," related Mr. Taft, "who once remarked to a lawyer arguing a certain case before him, 'You have stated that point to me twice. Now please do not repeat it again.'

From a photograph by Fishbaugh

THE RUINS OF THE PANAMA OF FOUR HUNDRED YEARS AGO

"'But, your Honor,' protested the lawyer, 'I want to make myself clear.' To which the judge with some asperity replied, 'Down in my country they say that a good judge can digest an argument after it is presented to him once. If he is a little dull it may take twice to make him comprehend, but when you give it to him a third time he receives it as intimation that you think he is a fool!'

"Therefore I repeat that the people of the United States are not excited by the headlines in the newspapers that the Gatun Dam is falling down, or anything of the sort. They are determined to have the Canal built. They are willing to spend the money to do so. And they believe in the men who are doing the work. To try to convince them that the Canal is wrong and the men behind it wrong is to assume that like the judge in the story they are thorough fools."

Which expresses the problem of the Gatun Dam in a nutshell. As a matter of fact there is no problem. The charge that the project is impracticable, that the dam is undermined by a subterranean lake, is not only the veriest nonsense but a malicious falsehood.

Here is the angle from which John F. Stevens, formerly chief engineer at the Panama Canal, views the broadsides of yellow journalism that have been hurled at Gatun:

"The animus of the attack lies deeper than any alleged fears as to the practicability of the proposed dam or locks. A suggestion in the newspaper that was at the head and front of the agitation that the whole work had better be dropped and the money already spent charged up to 'profit and loss' is very significant. Once such action were taken, the Nicaraguan scheme would come to the front again, backed by all of the powerful influences which before tried to foist it upon the American people for reasons not hard to understand.

"The question of the advisability of building an Interoceanic Canal has nothing to do with the matter. The people have decided that they want the Canal, and they are ready to pay for it. The choice of the location has been wisely made and the work properly planned. It is in competent hands and is being executed with a rapidity that surprises even its friends. The thing to do is to extend to Colonel Goethals and his assistants all the encouragement and moral help possible. The engineering world will have every reason to be proud of the result when it is an accomplished fact."

We have heard much of the Gatun Dam from the engineer's standpoint, from the muck-raker's

standpoint, and from the politician's standpoint. What are the central, vital details from the standpoint of the average American citizen who does n't know anything about the engineering technicalities and does n't care anything about the muck-raking broadsides? Behind the mass of blue-prints and charts what are the plain facts that enter into its construction?

As a foundation, we have the initial statement that the great mass of earth and stone, which we call the Gatun Dam, will shelter the largest artificial body of water in the world, measuring 167 square miles. On its surface the world's mightiest vessels of peace and war may be expected to gather. On this inland sea, created by man's ingenuity, a fleet will be able to anchor with as much ease and safety as in the largest harbor in the world.

It will need tens of millions of dollars, tens of thousands of men, and years of the most patient and exacting labor to accomplish this achievement. It is a bald statement to say that the project will be one of the engineering marvels of history. Perhaps a generation ago it would have been deemed impossible. Yet the twentieth century engineering expert shrugs his shoulders if you suggest the difficulties of the project. He will tell

you that it is just a question of money and men and time. As for the rest it is merely a matter of following one general policy as plain to the engineer as the printed page is to the layman. As a matter of fact the Gatun Dam presents fewer problems than the metropolitan sky-scraper does to the architect. When completed the dam will be a huge embankment 7700 feet long—nearly a mile and a quarter,—half a mile wide at the base, 90 feet high, and tapering to a breadth of 100 feet at the top. These are big figures in fact as well as on paper. But the veteran engineer digests them without a quiver of an eyelash. They are only the dimensions of a mass of earth and stone and cement long enough and high enough and firm enough to hold back the pressure of water against it. It will be built almost in a straight line. The earth beneath is solid. There are no ugly hollows nor treacherous swamps. Certain sensational newspaper writers have said that a vast subterranean lake exists under the ground and that the whole structure might crumble into its depths without warning. The engineers at Panama, however, do not even reply to this charge now. "If there is such a lake," argues the bronzed man in white duck who has been solving the engineering problems of the

Canal for five years, "don't you suppose I would know more about it than a newspaper man? And if I knew there was such a lake, do you suppose that I would ruin my reputation by going ahead on a line that would end in failure? And again, don't you give me the credit for a small degree of patriotism? Do you think that I would want my country to spend millions of dollars in a project that might collapse before it is completed? The charge that there is a subterranean lake under the Gatun Dam is not only a ridiculous statement but a malicious one. The whole project reduces itself to the question of building a solid embankment on solid ground. The Singer Building in New York is regarded as an architectural wonder, but after all the problem of its construction was merely that of putting one story above another on a firm foundation. That is our only problem at the Gatun Dam, that—and harnessing the Chagres River."

Here we have the most puzzling factor at the Panama Canal. The Chagres River is at once the greatest boon and the greatest drawback which the engineers are facing. Without it the present course of the Canal would be almost impossible. Like dynamite, however, it is an agency which may be just as powerful for evil as

for good. The difficulty does not lie in utilizing the Chagres River but in controlling it after it has been put to work. Unlike man it does not measure a day's work by the union scale, and having accomplished a certain task, takes particular delight in tearing it to pieces. It is not a well behaved stream in any sense of the word. It refuses even to stay where Nature has placed it. Every few months it rises in a rage and sweeps over its banks with a fury which on certain memorable occasions has not abated until the surrounding territory for miles has been deluged with angry, swirling waters. At Gatun it has even attained a volume as large as that of the Great Falls of Maryland. And then when it subsides it goes to sleep and its current dwindles almost to nothing. For months it seems to share the stupor of the tropics, hardly mustering energy enough to reach the Caribbean. During these periods it is the laziest stream from Nicaragua to Colombia. The problem, therefore, of keeping the Chagres River at steady, systematic work is a difficult one. And the success of the Canal depends largely on its solution.

In a paragraph the plan of the Canal-builders is to dig a straight channel 5000 feet wide and 40 feet deep from the Atlantic coast to Gatun, where

a system of three locks will lift vessels to the 85-foot level of the great inland lake, which will be formed by the Chagres River when it is turned from its present course at this point. The Gatun Lake is three miles from the Atlantic coast. It will carry vessels for the next twenty-five miles of the interoceanic voyage, which brings them to Las Cascadas. Here they enter the Culebra Cut, the only point where the route becomes in a technical sense a canal. This section continues for seven miles, when the vessels are lowered to a second lake at Miraflores, formed by two dams of which the largest is located at La Boca, almost within the shadow of the Pacific. This latter lake is five miles in extent. At Miraflores are located two duplicate locks for conducting the vessels through the last stage of the journey to the waters of the western ocean. The Isthmian waterway is just forty miles in extent, five eighths of which will be furnished by the waters imprisoned by the Gatun Dam, in other words, the Chagres River under harness.

The Gatun Lake will never be less than 42 feet in depth along the ship route, and for the first sixteen miles its navigable width will exceed a half a mile. In the next nine miles, its width diminishes gradually to 300 feet, and when it

reaches the Culebra Cut the width at the bottom will be only 200 feet. The entire canal, however, will average a width of not less than 500 feet.

The Gatun Dam will consist of two great piles of rock 1200 feet apart and rising to a point 60 feet above mean tide. The intervening space will be filled by earth and stones deposited by giant hydraulic machines. In addition to the Chagres River the ground to be covered by the dam is crossed by the watercourses of the old French Canal and the West Diversion. It was at the former that the stories of the instability of the project had their birth.

The south rock pile was being constructed here in the early part of November, 1908. A newspaper correspondent on his way from Colon to Panama noticed a group of engineers and workmen gathered about the vicinity with an air of unusual excitement. The Chagres River had been in a flood stage for several days and a portion of the railroad track was temporarily under water. When the train was halted the newspaper man strolled over to the scene of activity.

A portion of the dam had slipped back owing to a slight settling of the ground beneath. This was the fifth slip which had occurred since the

work of construction. The others, however, had been deemed too trivial to cause concern and had been overcome with a few days' labor in readjusting the slope of the masonry. The reporter, however, saw an opportunity for a sensational cable dispatch. It had been only a few days before that the story of the underground lake had appeared. What more logical than the theory that the whole dam was slipping down into the mysterious subterranean pool? This was the argument of the reporter. When he walked into the cable office it was with several pages of closely written manuscript. The next day the nation was ringing with the news that the Gatun Dam was a wreck. Before an official denial could be printed, the slip at the French Canal had been repaired and the men on the job had forgotten all about it.

As a record of history, it is on such trivial incidents as this that most of the muck-raking charges against the Panama Canal have been founded. One American writer who has been most prolific and stubborn in his cries of failure proved himself unable to distinguish a dredging machine from a steam shovel.

The truth is that the charges against the Gatun Dam have been made by those who either do not

know the real facts or do not want to know. The men who know the situation, and are qualified to discuss it intelligently and fairly, endorse the project without reservation. The American people may rest assured that the engineers in charge of the Panama Canal, who have pledged their words to the nation that it not only can be dug but will be dug, are worthy of their deepest confidence and support. The muck-raker is entitled to a hearing when he has the truth on his side. Indeed he should be supported whether he strikes at the government or at the individual. But when he has n't facts or even shreds of facts to support his charges, and in the face of the world tries to riddle his country's cause, he is open to the suspicion that he would sell his nation's honor as quickly as he would his own.

CHAPTER XV

IS IT ALL WORTH WHILE?

WHAT is Uncle Sam really to gain from the Panama Canal? In dollars and cents, how is this $400,000,000 or $500,000,000 investment to pay? When the Canal finally is completed—what?

In the record of the world's great waterways, the Suez Canal is a triumphant success. In cold figures, it has cost $100,000,000. In an average year, its gross revenues amount to twelve per cent. of this expenditure. In other words, the investment yields a return of $1,000,000 a month. In one year, 4000 vessels with a combined tonnage of 15,615,309 pass through the waterway.

The most conservative prophet will admit that Panama offers far greater commercial possibilities than will ever be attained by the Suez route. But this is not to say that the Panama Canal is or will be the greatest in the world—from a financial viewpoint. Such a rose-tinted assertion must be shattered in the beginning.

It will pay. This is not fairly certain, but absolutely so. How much or how soon are questions which cannot be answered definitely. On an investment of $400,000,000 a six per cent. return would mean a yearly income of $24,000,000—double the total receipts from the Suez Canal. Even a ten per cent. profit, however, could not equal the returns from the famous "Soo" Canal, which, as the throat of the Great Lakes, swallows more millions, both in tonnage and dollars, than ever can be possible at Panama. This from the standpoint of the investor. It is from the standpoint of the public that the real possibilities of the Panama Canal are most vividly silhouetted.

The Suez Canal was built frankly to make money. Back of it is a private corporation shrewd enough and strong enough to demand from the golden stream of the world's commerce an enormous profit. The Panama Canal is to be viewed from an exactly opposite angle. It is not being constructed to provide a gigantic revenue either for a private corporation or for the Government. Its primary object is essentially one of public service. Its central purpose is the promotion of American industry and American commerce as factors in our national development. If it never paid more than operating

expenses to the Government, the project would yield an incalculable return in the new industrial epoch it will mark.

The Panama Canal may be operated on one of four policies. A toll rate may be charged large enough to return to the Government not only its original expenditure but a profit on the investment. Again this toll may be reduced to a point barely large enough to create a sinking fund, which in time may balance the vast expenses of the undertaking. Still again the Government may not seek reimbursement for the cost of construction, but may endeavor merely to cover the operating expenses. As the last and probably the least likely policy, the Government may remove the Canal entirely from tolls, and leave it free to our own nation if not to the world.

As a problem in multiplication, suppose we institute a toll rate of one dollar a ton at the Panama Canal. This would be quite reasonable. Indeed we could increase it to a dollar and a half without being exorbitant. In one year we may expect that a tonnage of from 4,000,000 to 10,000,000 will pass through the great waterway. In course of time it will be much more, and far greater than the records of the Suez Canal. We are dealing now, however, with the facts which

we may expect within three or four years after the opening of the Canal. On a tonnage of 6,000,000 we could anticipate then a revenue of $6,000,000. Within ten years this could well be doubled. If the Canal were the property of a private corporation, a toll of at least a dollar and a half would be charged, and the project could be expected to yield within ten years a profit of from four to five per cent.

Half of the population of the globe live on the Pacific Ocean, to which the Panama Canal will be the most direct and feasible gateway. This is a commercial fact, whose possibilities the world cannot measure—yet. And the Canal is to be viewed from yet another angle. It will be a part of the North American coast line, affording the first water communication we have ever had between our Atlantic and Pacific States without rounding South America. The Panama Canal will tap five main arteries of commerce—Atlantic North America, Pacific North America, Pacific South America, Australia, and Eastern Asia. Between many of these markets, high freight rates and long water routes have built almost impregnable barriers.

For example, from New York to San Francisco by water is now a journey of 13,714 miles through

the Straits of Magellan. The Panama Canal will reduce this by more than half, to be exact effecting a saving of 8415 miles. From New York to Yokohama by way of the Suez Canal is a distance of 13,564 miles. By way of the Panama Canal it will be lessened to 9835 miles. From New York to Guayaquil is now a journey of 10,425 miles. The Panama Canal will lower this figure by more than three fourths, reducing it by 7561 miles.

Curiously enough it is farther by water from New Orleans to San Francisco than it is from New York owing to the winding route through the Gulf of Mexico and along the northern coast of South America. At the present time it is a distance of 14,114 miles. The Panama Canal will reduce this to 4698 miles. From New Orleans to Yokohama is now 14,929 miles. By way of the Panama Canal it will be lessened to 9234 miles. Compare the distances to Australia. When the Panama Canal is completed, the present water route from New York to Sydney, Melbourne, and Adelaide will be decreased from one fourth to one third.

A new map, geographically, commercially, and financially, will be traced by the Big Ditch at Panama. How it will pay is much clearer than

how much it will pay. In the foreground is the cyclonic boost which it will give the American cotton and iron markets. The Southern cotton growers now reach the Asiatic ports by the cumbersome route of the Suez Canal via New York. Zigzag routes and smothering freight charges are devouring the item of profit. Europe, with the key to the situation, is turning it slowly in the lock against American competition. The Panama Canal would revolutionize these conditions with the wrench of a Kansas cyclone.

South America spends $86,000,000 each year for cotton. Only five per cent. of this amount goes to the United States. The remainder is cornered by the European exporters who hold the west coast of South America practically at their mercy through the lessened expense of transportation. Here again the Panama Canal would reverse this situation like the change of slides in a stereopticon.

Cotton is one of the greatest of our products. Ever since the dream of Eli Whitney became a reality, cotton bales have been rising to a higher and higher pinnacle on our financial horizon. Of recent years men have learned that our cotton development is being smothered, that our market is not keeping pace with our production. The

cotton growers of Europe, often with a less investment and less expenses, are gathering greater returns than the American planters, who moreover are not putting forth their full efforts because of the handicapped market they are facing. South America would use our cotton in preference to that of Europe, but it is not going to pay more. Europe sends her cotton through the Suez Canal with a transportation charge reduced to the minimum. We have to send our cotton either down around Cape Horn or follow laggardly in the footsteps of our European competitor through the Suez Canal. With a freight expense three and four times greater than his, competition is absurd.

Iron can be produced more cheaply at Birmingham, Alabama, than at any other point in the world. Here again the barrier of transportation closes the great South American and Asiatic markets. The Tennessee mills produce machinery of almost every pattern, machinery with a world-wide reputation, but it is out of the question for us to carry it to the countries of the Pacific in the hope of out-bidding Europe. The Southern States centre a large share of their manufactures on the steel and hardware industry. Their hardware is so good that we have long known the Pacific market would jump at it, if we could bring it

within the other fellow's prices. But we can't. We have to go double the distance, and add a freight charge heavier than the cost of production. If South America and Asia were thrown open to our Southern mills, their output would be doubled. This is impossible now. In the Panama Canal lies the magic wand which will make it possible.

The Big Ditch at Panama will solve the forestry problem—from one point of view. Vast forests sweep the Western coast, in which one of the greatest supplies of building lumber in the world is located. It is beyond our reach now, at least beyond the reach of the Eastern markets, because of the excessive freight charges. Consequently we have to view it as something unattainable. The cost of water transportation is one fifth that of overland transportation. With the ocean itinerary opened by the Panama Canal, the East will be for the first time able to reach the Western lumber, and another segment of the industrial revolution will be unfolded.

Indefinitely the commercial field of the Panama Canal could be lengthened—to the items of coal, fruits, cereals, fish, grain, manufactured goods in general and particular, and even the broadening possibilities before the American ship builder.

With an inland canal from the Great Lakes to the Mississippi, and the deepening of the passageway to the Gulf, the dream of an ocean greyhound floating majestically southward from Duluth to Colon, and thence through the Panama Canal to the countless ports of the Pacific, is easy of accomplishment.

And who can measure the golden trail in its wake?

APPENDIX

As the latest full and authoritative account of the progress made in digging the Panama Canal, the subjoined report should prove of the first interest to all who are curious regarding the colossal task now in process of accomplishment on the Isthmus.

FULL TEXT OF THE REPORT OF THE SPECIAL BOARD OF ENGINEERS SUBMITTED TO CONGRESS BY THE PRESIDENT

WASHINGTON, February 16, 1909.

SIR: In accordance with your instructions, we have visited the Isthmian Canal, in company with Hon. William H. Taft, and have examined the work in progress and the plans for the structures as far as now developed.

We have given especial consideration, under the instructions of Mr. Taft, to the foundations for the Gatun Dam, and the feasibility of constructing and maintaining thereon a safe dam for retaining water at 85 feet above sea-level.

We have examined the slides in the banks of the Canal and the surveys, plottings, and sections that have been made of them. The subsidence in the fills in the toes of the dams and in the railway embankments has also been examined, and we have considered the effect of the qualities of materials

thus disclosed upon the construction of the various works and upon their ultimate stability.

We have also considered the evidence that has been accumulated as to the permeability of the different materials and the possible loss of water by percolation through the bed and banks of the future Gatun Lake; and the question whether such loss of water by seepage would result in materially reducing the water supply or in undermining and ultimately crippling the structure.

GATUN DAM

The Gatun earth dam is the central point of discussion, and we were instructed by Mr. Taft to give it first consideration in the light of all new evidence.

We are satisfied, both from the records of the experiments that have been made and from our own personal examination of the materials, as seen in cuts now open and as disclosed by samples from test borings, that there will be no dangerous or objectionable seepage through the materials under the base of the dam, nor are they so soft as to be liable to be pushed aside by the weight of the proposed dam so as to cause dangerous settlement.

We are also satisfied that the materials available and which it is proposed to use are suitable and can be readily placed to form a tight, stable, and permanent dam.

The type of dam now under construction is one which meets with our unanimous approval. It is a combination of rock fill and hydraulic fill, in which the exterior faces are to be composed largely of rock of all sizes obtained from the canal excavation, dumped

and laid on slopes much flatter than are ordinarily found in earth dams, while the interior of the great mass will consist of clayey material obtained by hydraulic dredging from large deposits at a little distance from the dam and carried by water through pipes to the places where it is to be used. The material as delivered is a mixture of earth and water. The material held in suspension slowly deposits, finally forming a solid, water-tight embankment. The pond necessarily maintained on the top of the dam during construction tests the embankment at all stages of its growth, searches out any weak points, and leads to the closure of any voids or cracks.

The most practical question in the construction of the Gatun Dam is the possible slipping and sliding of the materials underneath and in the body of the dam. The materials, speaking broadly, are of a clayey nature, generally impervious to water, but sometimes slipping when subjected to heavy unbalanced pressure or on high steep slopes when saturated with water. In this respect the materials differ radically from the sandy and gravelly materials which have been frequently used in the construction of other earth dams.

In order to build a dam of these clayey materials that will be stable and permanent, it is necessary that the slopes should be flatter than would be needed to secure the stability of a dam of siliceous, sandy, or gravelly materials.

The evidence that has been accumulated as to the degrees of slope that are stable with these materials seems to us conclusive. The fact that the materials are slippery does not mean that a dam built from them is necessarily less stable than a dam built of

materials that do not slip so easily. It does mean that, in order to secure stability and permanency, the dam must be built with a greater thickness at the bottom.

The dam as proposed is more than a third of a mile in horizontal thickness at its base, including the rock-fill portions.

The design upon which the work is now being prosecuted abundantly fulfils the required degree of stability and goes far beyond the limits of what would be regarded as sufficient and safe in any less important structure.

As a matter of convenience and economy during construction, materials have been piled up on slopes much steeper than those contemplated in the finished work. Generally, the materials so placed have remained in position, but in some cases slips have occurred. The occurrence of these slips is of no serious consequence either in the practical execution of the work or in the ultimate stability of the structures. We can readily understand how incorrect deductions may have been drawn from these occurrences, especially by those not fully informed as to the character of the materials and the ample dimensions and much less steep slopes of the proposed structures in their final form.

We were requested to consider the proper height for the crest of the Gatun Dam, and after consideration concluded that it could be safely reduced 20 feet from that originally proposed, namely, to an elevation of 115 feet above sea-level, or 30 feet above the normal level of the water against the dam. We are also of the opinion that the sheet piling recently proposed under the base of the dam may be safely omit-

ted. The narrow cut-off trench now in progress through the upper earth stratum on Gatun Island and elsewhere and designed to be refilled with sluiced material should be continued.

Changes in these respects will facilitate the work of construction and will reduce somewhat the cost of the proposed work.

A full study of all the data at hand, and of the materials, and of the plans that are proposed with the above modifications, leaves no doubt in our minds as to the safe, tight, and durable character of the Gatun Dam.

CHANGES IN PLAN OF CANAL

It was suggested to us by Mr. Taft that we give special consideration to those changes which have been made in the plans of the minority of the Board of Consulting Engineers of 1905 since the adoption of the project.

Change in Position of Lower Pacific Locks

One of the most important of these changes is the moving of the lower locks on the Pacific end of the Canal from La Boca, on the shore of Panama Bay, to Miraflores, about 4 miles inland.

This change involved abandoning the construction of two earth dams at and near La Boca and the substitution of about 4 miles of deep-sea level channel 500 feet wide from La Boca to Miraflores in place of a wider channel through the lake that would have been created by the dams.

Before this change was made work had been commenced upon the toes of one of the dams. The

material had been piled up to a considerable height on slopes steeper than were capable of being supported by the underlying material. Under these conditions settlements occurred with lateral displacement of some of the underlying material. Your board, after carefully inspecting the ground and the partially completed work, is of the opinion that these settlements cause no reason to doubt the stability of the proposed dams. We are unanimously of the opinion that stable and water-tight dams of substantially the proposed dimensions could have been constructed on the proposed sites without recourse to dredging out the underlying soft material.

The report of the minority of the Board of Consulting Engineers of 1905 recognized that an objection might be made from a military point of view to placing locks on the shore of a bay, exposed to guns of hostile ships. We now understand that the controlling reason for the change was a military one. This change in the plans will result in an increase in cost of the Canal by an amount judged from evidence at our disposal to be not less than $10,000,000. We are informed, however, that this change would greatly lessen the cost of fortification.

Increased Width of Canal

Another change is the increase of the minimum bottom width of the Canal from 200 feet to 300 feet. This applies to a length of about 4.7 miles in the Culebra Cut. We understand that this change will increase the cost of the work by about $13,000,000. The work upon the excavation of the Culebra Cut under the revised plan has now so far advanced that

this widening will not delay the completion of the Canal.

The widening will permit ships to pass one another in this portion of the Canal, as they may under the original plan in all other portions, and will otherwise facilitate navigation through it.

If slides occur after the completion of the Canal, the wider Canal is not as likely to be blocked as a narrow one.

We understand that this change was authorized directly by you on the presentation of its advantages by the Chief Engineer, and we merely call attention to it as one reason for the increased cost of the Canal.

Increased Size of Locks

Another change is the increase of the dimensions of the locks from 95 by 900 feet to 110 by 1000 feet. The increase in width we understand has been made in compliance with a request from the General Board of the Navy Department, in order to allow the passage of the largest war vessels contemplated.

A large increase in cost is involved in these enlarged dimensions.

Changes in Breakwaters

An important change is proposed in the location of the breakwater at the Atlantic end of the Canal. The plan provisionally adopted by the Board of Consulting Engineers of 1905, and adopted for the purpose of estimate by the minority of that board, was for a breakwater generally parallel with the channel, which included less than one third of Limon Bay; whereas the breakwater in the location now proposed

will protect the entire bay and furnish a more commodious harbor not only for ships using the Canal, but for all other shipping which makes use of the port. A considerable increase in cost is involved in this change.

We had an opportunity to view the present harbor during what is said to have been the only severe norther of the past two years, and have no doubt that a good breakwater is a desirable adjunct to the Canal. We are not prepared to pass on the precise location, form, or cost of this.

A change of less importance has been made at the Pacific end by relocating the dredged channel leading to deep water and increasing its width from 300 feet to 500 feet and by constructing a breakwater from the shore at La Boca to Naos Island with material excavated from the Culebra Cut. This breakwater, now under construction, serves to prevent currents across the Canal cut and tends to prevent deposits in the dredged channel and to increase the safety of navigation. The breakwater may also serve to carry a roadway to Naos Island. These changes involve some additional expense.

Relocation of Panama Railroad

The alignment of the Panama railroad has been materially changed south of Gatun. This change was made because it was found that the swamp near the Gatuncillo River would not support the very high railroad embankment required, if made with ordinary slopes, and a line crossing at a point higher up the river was selected, which does not, however, materially increase the length of the railroad. The con-

struction of the railroad will cost much more than was estimated by the minority of the Board of Consulting Engineers, who were unable to procure surveys of the proposed location. The recent change in location affords more ample and convenient anchorage immediately above the locks.

Other Changes

Some further changes or additions which have not yet been fully worked out have been mentioned to us as likely to be made as the work progresses, namely, the dredging out of a broad anchorage basin immediately downstream from the Gatun Locks, another for anchorage and room for turning of long ships near La Boca, and possibly another just below the Miraflores Locks. These can all be delayed until the completion of the main work of canal excavation and lock building, and then executed by the dredges that have done the main work. The work can thus be done without additional equipment, and at a low price per cubic yard.

PRESENT CONDITION OF WORK

It has been suggested that we report upon the condition of the work and the progress being made, and, if found possible in the time at our disposal, upon the probable time of completion.

Organization

We have seen the work under way on all parts of the Canal. We have become acquainted with the engineers in responsible positions and have noted the organization and equipment.

It is our impression that the work is well organized and is being conducted energetically and well.

The work is done by day labor and not by the contract system.

The men are well paid, well housed, well fed, and well cared for in case of sickness or accident. Houses, furniture, fuel, water, drainage, and lights are furnished to employees without cost. Roads are built, schools supported, and Young Men's Christian Association buildings provided, which are practically club buildings. Parts of the running expenses are also paid. The premises are cleared and drained and the grass kept cut. The climate is especially adapted to outdoor life, and the ample porches, entirely enclosed by bronze-wire screens, give the greatest facility for this. We are especially pleased with the architectural arrangements of the houses. They are admirably adapted to the climatic conditions.

Bachelor quarters and hotels furnishing meals at moderate prices are also provided by the government.

Hospitals are provided, free medical attendance is furnished to employees, and medical attendance at low rates is supplied to families of employees.

A limited amount of free transportation, namely, one excursion trip each month to any station, is furnished on the Panama railroad to employees, and half rates are given in all other cases, and also half rates to families of employees. Free transportation in some cases, and in all other cases transportation at reduced rates to and from the Isthmus, is provided to employees and their families.

Six weeks' leave of absence each year, with full pay, is given to all monthly employees, and this includes not only office and engineering forces, but also the mechanical forces on the monthly basis.

The medical and sanitary department is especially

to be commended for its success in exterminating yellow fever and controlling malaria, and for other measures which have made the Isthmus a thoroughly healthful place in which to live.

The cost of the sanitary department, which represents the cost of keeping the Isthmus healthful, amounts to about $2,000,000 per year. This is a large sum, but the work is well done, and any decrease in the efficiency of the sanitary service might readily prove disastrous to the prosecution of the main work.

We believe that in no other great construction work has so much been done for employees in the way of furnishing necessities, comforts, and luxuries of life at the cost of the work as has been done in this case. This is one reason for the high cost of the Canal.

Progress and Time of Completion

We have examined diagrams and statistics showing the amount of work accomplished by years and by months since the work was taken over by the United States, and showing the amounts of the various classes of work remaining to be done and the estimated rates of progress and times required for completion. It has been impossible for us to check these in detail, but we have compared them with other estimates, and with the work obviously done, and they seem reasonable to us. In the light of this showing, we see no reason why the Canal should not be completed, as estimated by the Chief Engineer, by January 1, 1915; in fact, it seems that a somewhat earlier completion is probable if all goes well, but in view of possible contingencies it is not prudent at this time to count on an earlier date.

Cost of Work

In examining the expenditures thus far made it must be borne in mind that large sums have been paid for steamships, dredges, steam shovels, locomotives, cars, tracks, shops, and all the equipment that is necessary to prosecute a work of this magnitude, and also that large sums have been spent for dwellings, offices, buildings of various kinds, for waterworks, sewers, paving, and other equipment, and that these expenditures have been made, in large measure, for the whole work, and that corresponding disbursements hereafter will be very much less in proportion than they have been to date.

Colonel Goethals has presented to us an estimate of the quantities of materials and the cost involved in the construction of the Canal as now planned, including all disbursements thus far made and the estimated amounts required for completion. These cover the greater width of excavation, the increased size of locks, the extra canal channel required by moving the Pacific Locks from La Boca to Miraflores. the improved harbor arrangements at Colon, and all other changes which have been adopted or which are now seriously contemplated. The payments to the New Panama Canal Company are included, and also the payments to the Republic of Panama and the cost of sanitation and Zone government, for which items the Board of Consulting Engineers of 1905 stated that it presented no estimates.

The estimates and allowances so made seem ample to us. In some items it would seem that considerable reductions could be made, but on the other hand, the work is large and novel and unforeseen contingencies

must be expected, so that it may be that the aggregate estimate as presented is not too large.

After deducting $15,000,000, representing the estimated receipts from the return of money loaned the Panama railroad, and from the collection of water rates to cover the cost of municipal improvements made in Panama and Colon, and from miscellaneous sources, this present estimate of the complete cost of the lock canal amounts to $360,000,000.

In making this estimate no reduction has been made for whatever salvage may be realized from the construction plant at the termination of the work, which plant has cost to date about $30,000,000.

The cost of the Canal as estimated in 1905 is frequently stated to be $140,000,000, but this is incorrect, as the minority report expressly excluded sanitation and Zone government, and the payments to Panama and the French company had already been made. Adding these amounts, using the present estimates of sanitation and Zone government, we have in round numbers the following :

Estimate of the minority of the Board of Consulting Engineers for the cost of construction, exclusive of sanitation and Zone government	$140,000,000
Payments made to the Republic of Panama and to the New Panama Canal Company	50,000,000
Sanitation and Zone government, as now estimated	27,000,000
Total	$217,000,000

The difference between this cost and the total cost

as now estimated is therefore $143,000,000. Of this amount nearly one half can be accounted for by the changes in the Canal and appurtenant works to which we have already referred, and the remainder is to be attributed mainly to the higher unit cost of the different items of the work, caused in part by the higher prices for plant, supplies, and labor which have prevailed in the United States since the estimate of 1905 was made, and which made it necessary to offer very high wages and special inducements in order to obtain the requisite force in a locality where the reputation for health was not good in the earlier years, in part to the adoption of an eight-hour day for most of the work instead of a ten-hour day, in part to the much greater expenditure for housing and care of employees and for auxiliary works than was anticipated, and in part, in our opinion, to the evident purpose to make the estimates ample and to provide liberally for contingencies.

When the work at Panama is completed, in addition to having the Canal, the United States will own the Panama railroad and the steamship line operated in connection therewith.

TYPE OF CANAL

In view of the fact that the cost of the lock canal, as now proposed, will largely overrun the estimate of the minority of the Board of Consulting Engineers of 1905, and that the excavation in the Culebra Cut is being made somewhat more rapidly than was anticipated, we have considered in a very general way the relative cost and time of construction of a sea-level canal.

Most of the factors which have operated to increase the cost of the lock canal would operate with similar effect to increase the cost of the sea-level canal, and at the present time there are additional factors of even greater importance to be considered as affecting the time of completion and cost of a sea-level canal. One of these is to be found in the Gamboa dam, proposed to be nearly 200 feet in height above its foundations, which would be about 60 feet below the normal river level. Prior to the construction of this dam a long and deep diversion channel must be provided of far greater magnitude than that for the Gatun Dam, which has been about two years in progress, and is not yet completed.

Judging by the time required for the construction of dams of similar magnitude in the United States, it is probable that were work on the Gamboa dam to be started as soon as possible this one feature of the sea-level project of the Board of Consulting Engineers of 1905 could not be completed until after the time required for the completion of the lock canal. The construction of this dam at Gamboa for the control of the Chagres is an essential preliminary to the excavation of the sea-level canal for the 13 miles from Bohio to Bas Obispo.

Furthermore, in addition to the Gamboa dam, the sea-level project provides for building for the control of tributary streams three large dams, the sites of which have not been examined.

Work is already far advanced on nearly all parts of the lock canal, and a change in the type would result in abandoning work done which represents large expenditure.

Under the plan now being carried out, the River

Chagres and each of the other rivers on the Isthmus tributary thereto is made an ally of the project. The waters of these rivers are handled economically and in such a way as to facilitate the operation of the Canal. With the sea-level project, these rivers instead of being allies would be enemies of the Canal, and floods in them would greatly interfere with the work.

The excavation of the Canal would be carried to 40 feet or more below sea-level and to a much greater depth below the bottoms of the valleys in which the upper streams now flow.

It would further be necessary to cut long and large diversion channels on each side of the Canal for streams entering the Chagres Valley. The cost of such lateral channels to protect the Culebra Cut alone from the comparatively small streams formerly entering it, including work done by the French, has probably been not less than $2,000,000. The channels required for the lower valley of the Chagres would be necessarily much longer, larger, and far more expensive.

ROCK EXCAVATION UNDER WATER

Much has been said about the economy of excavating rock under water by modern appliances as compared with the cost of such excavation in the dry with steam shovels after blasting.

We concur in the opinion of those in charge of work at the Isthmus that it is more economical, where the conditions are favorable, to excavate rock in the dry than by any under-water process now in use. Experience is not yet available to us which will justify the belief that, with the depth of cut and

the quality of rock found on the Isthmus, the general adoption of subaqueous methods would prove more expeditious or cheaper.

It is probable that more economical subaqueous methods will be sometime developed, but it would not be wise to base a change in plan of important work upon prospective results to be obtained by any method not yet thoroughly tried.

EARTHQUAKES

It has been suggested that the Canal region is liable to earthquake shocks and that a sea-level canal would be less subject to injury by earthquakes than a lock canal.

We have seen, in the city of Panama, the ruins of an old church, said to have been destroyed by fire, containing a long and extremely flat arch of great age, which convinces us that there has been no earthquake shock on the Isthmus during the one hundred and fifty years, more or less, that this structure has been in existence, that would have injured the work proposed.

Dams and locks are structures of great stability and little subject to damage by earthquake shocks. The successful resistance of the dams and reservoirs supplying San Francisco with water, even when those structures were located near the line of fault of the earthquake, gives confidence in the ability of well-designed masonry structures and earth embankments to resist earthquake shocks.

We do not regard such shocks as a source of serious damage to any type of canal at the Isthmus, but if they were so their effect upon the dams, locks, and

regulating works proposed for the sea-level canal would be much the same as upon similar structures of the lock canal. The Gamboa dam for controlling the floods of the Chagres in connection with the sea-level canal provides for a lake having an area of 29 square miles when full, and if this water were suddenly let loose into the sea-level canal it would seriously injure large portions thereof and wreck ships therein. A similar result would be reached if the other three dams of the sea-level canal retaining lakes, having an aggregate area of 10 square miles, were to be suddenly destroyed.

WATER SUPPLY

We believe that the sufficiency of the water supply for a lock canal has never been seriously questioned. It is true that during the dry season the natural flow of the streams would not be sufficient to furnish the water required for numerous lockages. There would even be times when the natural flow would not suffice to make good the loss by evaporation from the surface of the water in Gatun Lake. During the rainy season there is a great excess of water which can be readily stored in Gatun Lake with its area of 163 square miles. It is proposed to fill this lake during the rainy season 2 feet above its normal level, and to draw it as needed during the dry season. It is computed that by drawing it 5 feet below normal level, which draft would leave 40 feet of water through Culebra Cut, the supply in a dry year would be sufficient to serve from 30 to 40 lockages up and an equal number of lockages down daily. Each lockage might consist of a single large vessel, or a fleet of

smaller vessels capable of being in the lock at one time, as is common at Sault Ste. Marie. For comparison the published record shows that an average of only 12 ships per day passed through the Suez Canal in 1907.

Ultimately, if needed for increased traffic, additional water may be held from wet seasons and made available in dry ones. This may be accomplished either by raising further the high-water level in Gatun Lake or by lowering the low-water level in the lake, this lowering being accompanied, if necessary, by the deepening of the Canal, or storage may be provided by an entirely independent reservoir, for which there are excellent sites.

From our examinations in the neighborhood of Gatun Dam, we can find no reason to apprehend important loss of water by seepage through the ridges surrounding the lake, while in our judgment the bed of the lake will be practically impervious to water.

The water supply in sight is so much greater than any need that can be reasonably anticipated that the best method of securing more water when the time of need arrives does not require to be considered now.

CONCLUSIONS

Your board is satisfied that the dams and locks, the lock gates, and all other engineering structures involved in the lock-canal project are feasible and safe, and that they can be depended upon to perform with certainty their respective functions.

We do not find any occasion for changing the type of canal that has been adopted.

A change to a sea-level plan at the present time would add greatly to the cost and time of construction, without compensating advantages, either in capacity of canal or safety of navigation, and hence would be a public misfortune.

We do find in the detailed designs that have been adopted, or that are under consideration, some matters where other arrangements than those now considered seem worthy of study. As these proposed changes are of a tentative nature and do not in any case affect the main questions herein discussed, they are not taken up in this report.

Very respectfully,

FREDERIC P. STEARNS, JAMES D. SCHUYLER,
ARTHUR P. DAVIS, ISHAM RANDOLPH,
HENRY A. ALLEN, JOHN R. FREEMAN,
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